PHILIPS 28PT4494

MODEL

SERVICE MANUAL

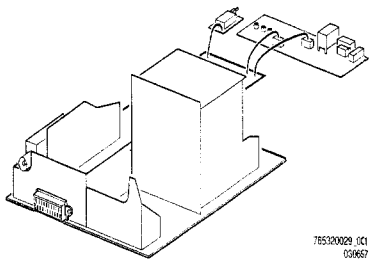
Colour Television

Chassis

L6.3

AA

Service
Service
Service



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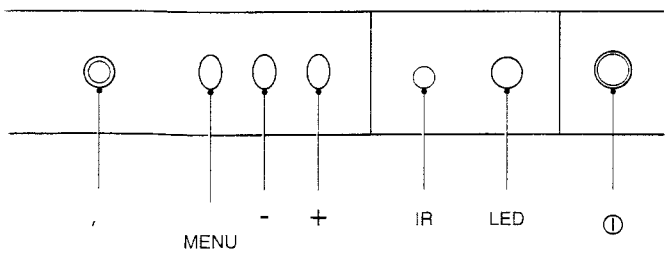
PHILIPS

1 Technical specifications

!ains Voltage:	:	220-240V ± 10% AC; 50-60Hz (± 5%)
!ains frequency	:	50 Hz
	:	60 Hz
ɔwer Consumption in stand-by	:	< 5 Watt
ɔwer Consumption normal mode	:	28" : 75Watt +/- 10%
·erial input impedance TV	:	75 Ohm - coax
.lin. aerial input VHF:	:	30mV
lin. aerial input UHF:	:	40mV
lax. aerial input VHF/UHF:	:	180mV
·ull-in range colour sync:	:	± 300Hz
·ull-in range horizontal sync:	:	± 600Hz
·ull-in range vertical sync:	:	± 5Hz
·icture tube range	:	25" and 28"
·ound output power	:	3 Watt mono execution
	:	2 X 3 Watt stereo execution
V Systems:	:	PAL I
	:	PAL BG
	:	PAL BG / SECAM DK
	:	PAL BG / SECAM LL'
·dications:	:	On Screen Display (OSD) green/red
	:	1 LED (red high intensity, red low intensity,
	:	"RC5' and error codes blinking red)
·CR programs:	:	0
Tuning and operating system:	:	VST
JV913E / IEC (VST):	:	VHFa:46 - 102 MHz
	:	VHFb:138 - 224 MHz
	:	UHF:471 - 855 MHz
JV915E / IEC (VST):	:	VHFa:48 - 168 MHz
	:	VHFb:175 - 448 MHz
	:	UHF300 - 860 MHz
JV917E / IEC (VST):	:	VHFa:48 - 118 MHz
	:	VHFb:118 - 300 MHz
	:	UHF:470 - 861 MHz
·943 / IEC (VST):	:	UHF:470 - 861 MHz
.ɔcal operating functions:	:	MENU / - / +



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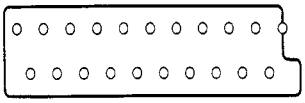
2 Connection facilities



1-	Audio	R (0.5Vrms ≤1kΩ)
2-	Audio	R (0.5Vrms ≥10kΩ)
3-	Audio	L (0.5Vrms ≤1kΩ)
4-	Audio	
5-	Blue	
6-	Audio	L (0.5Vrms ≥10kΩ)
7-	Blue	(0.7Vpp/75Ω)
8-	CVBS-status	0-1.3V:INT, 4.5-7V:EXT 16:9, 9.5-12V:EXT 4:3
9-	Green	
10-		
11-	Green	(0.7Vpp/75Ω)
12-		
13-	Red	
14-		
15-	Red	(0.7Vpp/75Ω)
16-	RGB-status	(0-0.4V:INT, 1-3V:EXT/75Ω)
17-	CVBS	
18-	CVBS	
19-	CVBS	(1Vpp/75Ω)
20-	CVBS	(1Vpp/75Ω)
21-	Earth socket	

3 Safety instructions, Maintenance instruction,

3.1 Safety instructions for repairs

Figure 3-1

1. Safety regulations require that during a repair:
   - the set should be connected to the mains via an isolating transformer;
   - safety components, indicated by the symbol (see fig. 3.1), should be replaced by components identical to the original ones;
   - when replacing the CRT, safety goggles must be worn.

2. Safety regulations require that after a repair the set must be returned in its original condition. In particular attention should be paid to the following points.
   - As a strict precaution, we advise you to resolder the solder joints through which the horizontal deflection current is flowing, in particular:
     - all pins of the line output transformer (LOT);
     - fly-back capacitor(s);
     - S-correction capacitor(s);
     - line output transistor;
     - pins of the connector with wires to the deflection coil;
     - other components through which the deflection current flows.

     Note: This resoldering is advised to prevent bad connections due to metal fatigue in solder joints and is therefore only necessary for television sets older than 2 years. The wire trees and EHT cable should be routed correctly and fixed with the mounted cable clamps.

   - The insulation of the mains lead should be checked for external damage.
   - The mains lead strain relief should be checked for its function in order to avoid touching the CRT, hot components or heat sinks.
   - The electrical DC resistance between the mains plug and the secondary side should be checked (only for sets which have a mains isolated power supply). This check can be done as follows:
     - unplug the mains cord and connect a wire between the two pins of the mains plug;
     - set the mains switch to the on position (keep the mains cord unplugged!);
     - measure the resistance value between the pins of the mains plug and the metal shielding of the tuner or the aerial connection on the set. The reading should be between 4.5 MW and 12 MW;
     - switch off the TV and remove the wire between the two pins of the mains plug.

   - The cabinet should be checked for defects to avoid touching of any inner parts by the customer.

3.2 Maintenance instruction

It is recommended to have a maintenance inspection carried out by a qualified service employee. The interval depends on the usage conditions:

- When the set is used under normal circumstances, for example in a living room, the recommended interval is 3 to 5 years.
- When the set is used in circumstances with higher dust, grease or moisture levels, for example in a kitchen, the recommended interval is 1 year.
- The maintenance inspection contains the following actions:
  - Execute the above mentioned 'general repair instruction'.
  - Clean the power supply and deflection circuitry on the chassis.
  - Clean the picture tube panel and the neck of the picture tube.

3.3 Warnings

1. ESD
   All ICs and many other semiconductors are susceptible to electrostatic discharges (ESD). Careless handling during repair can reduce life drastically. When repairing, make sure that you are connected with the same potential as the mass of the set by a wristband with resistance. Keep components and tools also at this same potential.
   - Available ESD protection equipment:
   - anti-static table mat (large 1200x650x1.25mm) 4822 466 10953
   - anti-static table mat (small 600x650x1.25mm) 4822 466 10958
   - anti-static wristband 4822 395 10223
   - connection box (3 press stud connections, 1 M ohm) 4822 320 11307
   - extension cable (2 m, 2 M ohm; to connect wristband to connection box) 4822 320 11305
   - connecting cable (3 m, 2 M ohm; to connect table mat to connection box) 4822 320 11306
   - earth cable (1 M ohm; to connect any product to mat or connection box) 4822 320 11308
   - complete kit ESD3 (combining all 6 prior products - small table mat) 4822 310 10671
   - wristband tester 4822 344 13999

2. In order to prevent damage to ICs and transistors, all high-voltage flashovers must be avoided. In order to prevent damage to the picture tube, the method shown in Fig. 3.2 should be used to discharge the picture tube. Use a high-voltage probe and a multimeter (position DC-V). Discharge until the meter reading is 0V (after approx. 30s).
3. Together with the deflection unit and any multipole unit, the flat square picture tubes used from an integrated unit. The deflection and the multipole units are set optimally at the factory. Adjustment of this unit during repair is therefore not recommended.
4. Be careful during measurements in the high-voltage section and on the picture tube.
5. Never replace modules or other components while the unit is switched on.
6. When making settings, use plastic rather than metal tools. This will prevent any short circuits and the danger of a circuit becoming unstable.
7. Wear safety goggles during replacement of the picture tube

3.4 Notes

1. The direct voltages and oscillograms should be measured with regard to the tuner earth , or hot earth as this is called (see fig. 3.3)
2. The direct voltages and oscillograms shown in the diagrams are indicative and should be measured in the Service Default Mode (see chapter 8) with a colour bar signal and stereo sound (L:3 kHz, R:1 kHz unless stated otherwise) and picture carrier at 475.25 MHz.

3. Where necessary, the oscillograms and direct voltages are measured with and without aerial signal. Voltages in the power supply section are measured both for normal operation and in standby . These values are indicated by means of the appropriate symbols (see fig. 3.3).
4. The picture tube PWB has printed spark gaps. Each spark gap is connected between an electrode of the picture tube and the Aquadag coating.
5. The semiconductors indicated in the circuit diagram and in the parts lists are completely interchangeable per position with the semiconductors in the unit, irrespective of the type indication on these semiconductors.

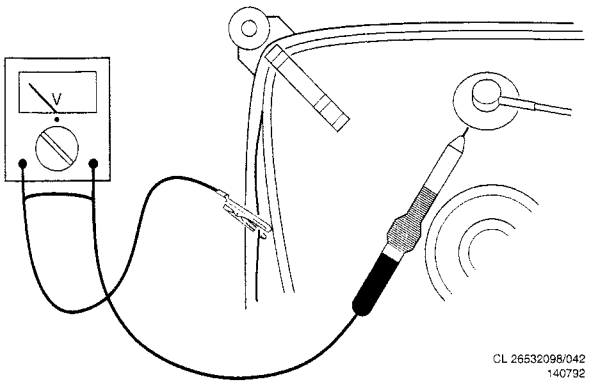


Figure 3-2

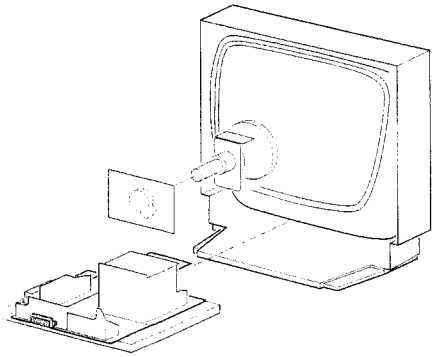
tuner earth tuner aarde la masse du tuner Tuner-Erde massa del tuner tierra del sintonizador	hot earth hete aarde la terre directe heißen Erde massa calda tierra caliente
with aerial signal met antenne signaal avec signal d'antenne mit Antennensignal con segnale d'antenna con la señal de antena	without aerial signal zonder antenne signaal sans signal d'antenne .ohne Antennensignal senza segnale d'antenna sin la señal de antena
normal condition normaal bedrijf fonctionnement normal normaler Betrieb funzionamento normale funcionamiento normal	stand by stand by position de veille in Bereitschaft modo di attesa posición de espera

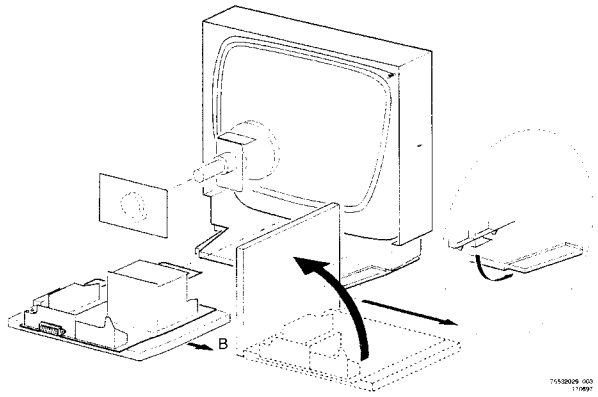
Figure 3-3

4 Mechanical instructions

For the main carrier two service positions are possible:

a. For faultfinding on the component side of the main carrier
b. For (de)soldering activities on the copper side of the main carrier.





Position A can be reached by first removing the mains cord from it's fixation, then loosen the carrier lips and then pulling the carrier panel for approximately 10 cm.
Position B can be reached from position A after disconnecting the degaussing cable. A stable service position can be created with the left hand side clip on the carrier panel and the cabinet (see fig.4.1).

5 Repair facilities

5.1 Functional blocks

On both the service printing on the copper and the component side, functional blocks are indicated by lines and text.

5.1.1 Test points

The L6 chassis is equipped with test points in the service printing on both sides of mono-board. These test points are referring to the functional blocks as mentioned above:

- P1-P2-P3, etc:Test points for the power supply
- L1-L2-L3, etc:Test points for the line drive and line output circuitry
- F1-F2-F3, etc:Test points for the frame drive and frame output circuitry
- S1-S2-S3, etc:Test points for the synchronisation circuitry
- V1-V2-V3, etc:Test points for the video processing circuitry
- A1-A2-A3, etc:Test points for the audio processing circuitry
- C1-C2-C3, etc:Test points for the control circuitry
- T1-T2-T3, etc:Test points for the teletext processing circuitry

The numbering is done in a for diagnostics logical sequence; always start diagnosing within a functional block, in the sequence of the relevant test points, for that functional block.

5.1.2 Service default-alignment mode (SDAM)

The service default-alignment mode is a pre-defined mode which can be used for faultfinding (especially when the TV gives no picture at all). All oscillograms and DC voltages in this service manual are measured in the service default-alignment mode.

Activating the service default-alignment mode can be done in 2 ways:

1. By short-circuiting the service pins S1 and S2 of the microcomputer (pin 14 of IC7600).
2. From normal operation mode by pressing the button "DEFAULT" or "ALIGN" on the DST (Dealer Service Tool) RC7150.

Leaving the service default-alignment mode to normal operation can only be done by the stand-by on the remote control or by pressing diagnose 99 followed by the OK-button on the DST (so not via mains switch "off"; after mains switch "off" and then "on" again the set will start up in the service default-alignment mode again to enable easy faultfinding).

Functions of the service default-alignment mode:

1. All analogue settings (volume, contrast, brightness and saturation) are in the mid position.
2. Set is tuned to program number 1
3. Delta volume settings are not used (delta volume setting = a delta on the volume setting)
4. OSD error message (present available error code) is displayed continuously
5. The OSD-key will act as search and auto store on the maximum program number.
6. Automatic switch off function (set switches "off" after 15 minutes no IDENT) will be switched off
7. Hotel mode will be disabled
8. All other functions remain normal controllable

Service default-alignment menu: new option settings are activated immediately.

1. Software version of the microprocessor used in that typical set is displayed in the right top corner
2. A counter in the middle of the screen indicate the normal operation hours of the set in a hexadecimal code (every time the set is switched "on" the counter is incremented by 1 hour, so +1 at the counter).
3. The "S" in the middle of the screen next to the counter indicate that the set is in the service default-alignment mode
4. Option codeThis code indicates the Options setting of the set.
5. Error code history;

The 5 last different error codes occurred are stored in the EEPROM memory; last error code detected will be displayed on the left side (see for an overview of all possible error codes Fig. 8.x), so e.g.:

0 0 0 0 0 means no error codes present in the buffer

3 0 0 0 0 means one error code present in the buffer; error code 3

3 2 0 0 0 means two error codes present in the buffer; last detected error code is error code 3, previous detected error code is error code 2

The error code history buffer is cleared when the Service Menu is left by the stand-by command or by diagnose 99 command. In case the Service Menu is left by the mains switch "off" the error code history buffer will not be cleared.

Option code +Counter + "S" for service menu active + software version->	001	00233	1.0
Error code history -->		23000	
Option setting row -->	-	SYSTE M BG + I	+

Option setting:

In the bottom line the options are given.

Control of the options is with the following keys on the remote control:

- PROGRAM +/-: Select the option to be changed; Via the "PROGRAM +/-" button the option to be changed can be selected. The selected option is implemented immediately.
- CONTROL up/down: Changes the setting of the option.
- MENU +/-: Changes to a submenu; via "MENU +/-" buttons a submenu is selected in which in a stereo version the sound/sync alignment can be done.

The options are stored immediately in the EEPROM.

The following table indicates the possible hardware and software options and their technical consequences:

Text displayed in the option row in the service menu	The technical consequence for the selected option
SINGLE	--> For a PAL BG only or PAL BG/SECAM BGDK set

SYSTEM I:UK	--> For a PAL I only set
SYSTEM BG+LL'	-->For a PAL BG/SECAM LL' set
SYSTEM BG+DK	--> For a PAL BGI/SECAM LL' set
NATIONAL BRAND MAxxxxx -->	Selects MENU-Layout National Brand styling

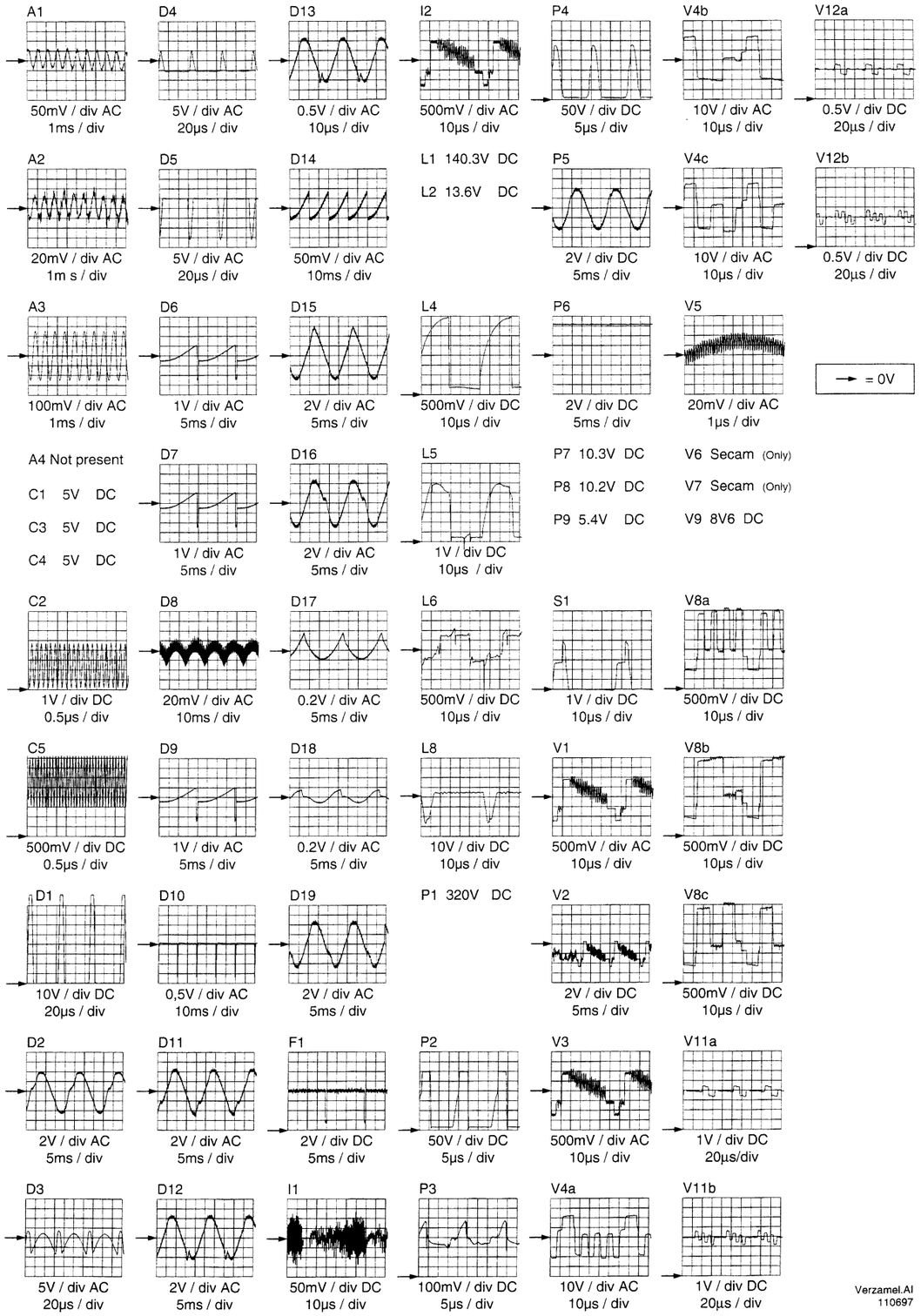
5.1.3 *Error messages*

The microcomputer also detects errors in circuits connected to the I2C (Inter IC) bus. These error messages are communicated via OSD (On Screen Display) and a flashing LED in the service default-alignment mode. (error code history buffer):

1. In normal operation; in normal operation no errors are indicated.
2. In the service default-alignment mode; in the service default-alignment mode both the "OSD error message" and the "LED error" indication will display the present detected error continuously.

"OSD error number" (servicemenu)	"LED behaviour"	Error description	Possible defective component
0	No blinking LED	No error	--
1	LED blinks ones	mC error	IC7600
2	LED blinks twice	General I2C error	I2C bus is blocked
3	LED blinks three times	EEPROM error	IC7605

6 Overview oscillograms



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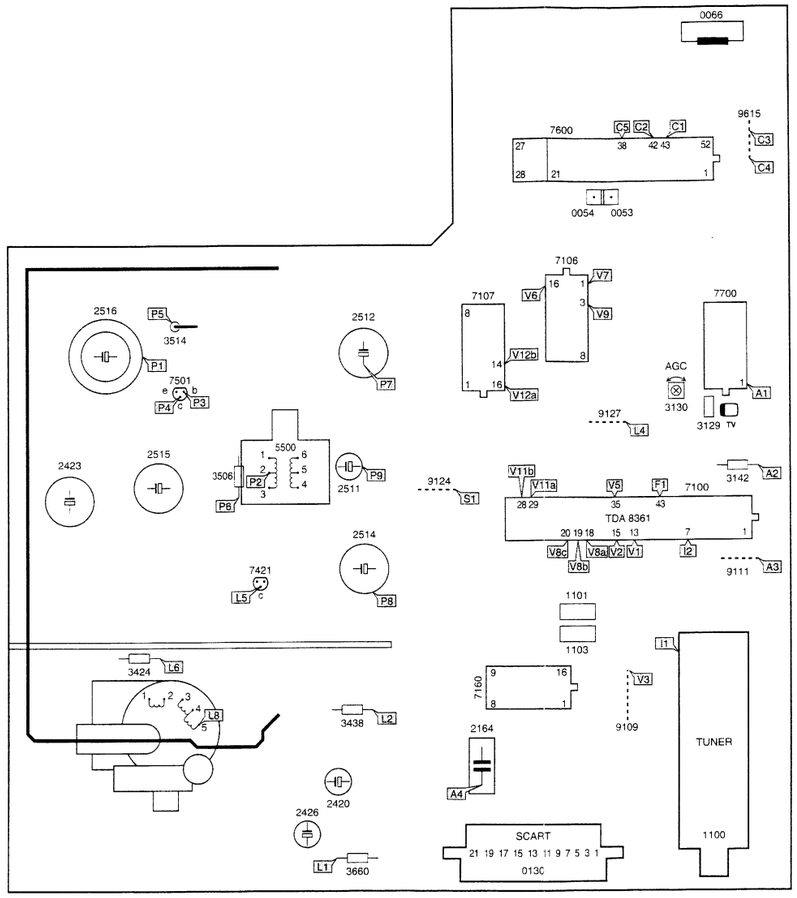

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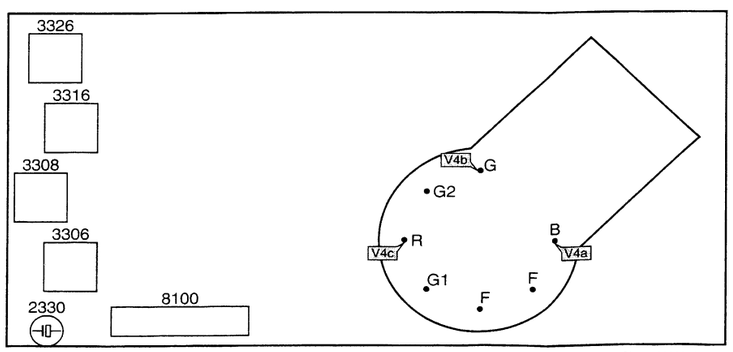

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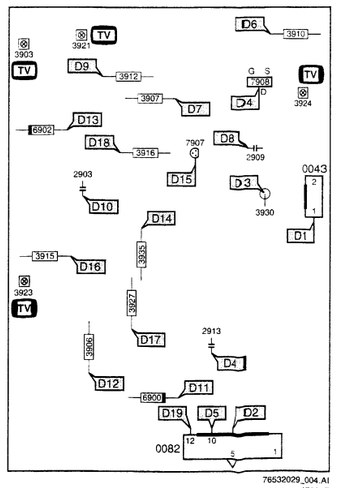

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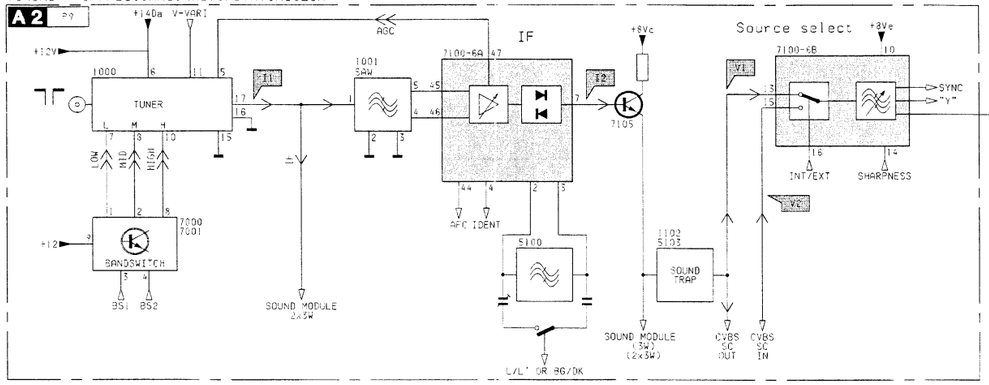
6 Overview oscillograms

TUNING + IF/Abstimmeinheit/SYNTONISEUR

A2 P9



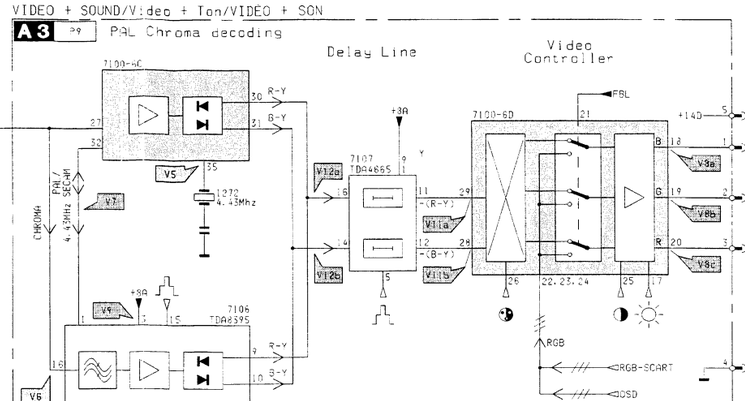
VIDEO + SOUND/Video + Ton/VIDEO + SON

A3 P9

PAL Chroma decoding

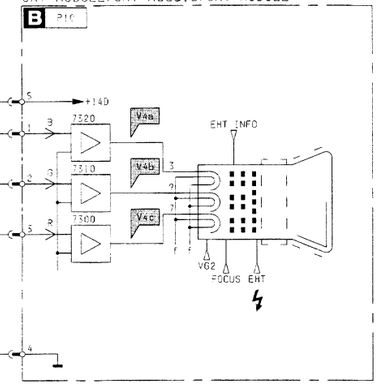
Delay Line

Video Controller

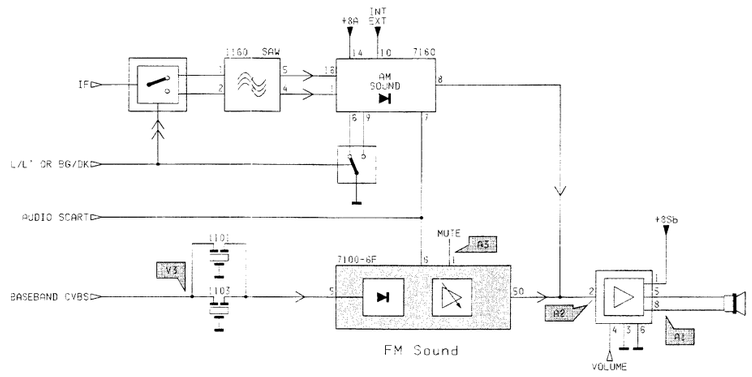


CRT MODULE/CRT Module/CRT MODULE

B P10

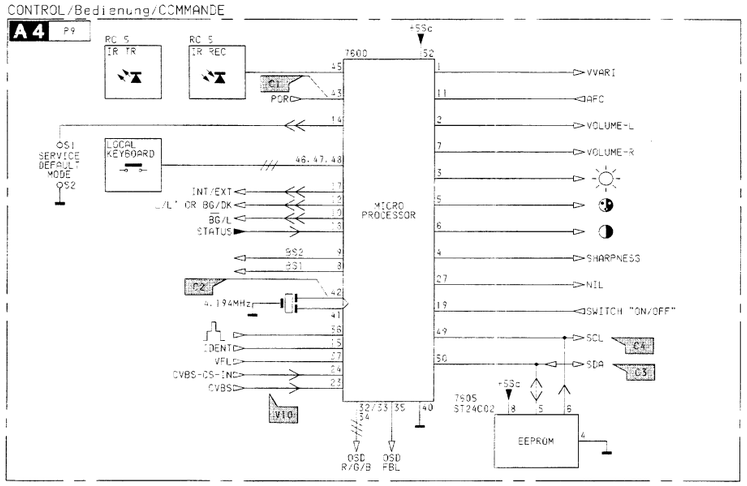


SECAM



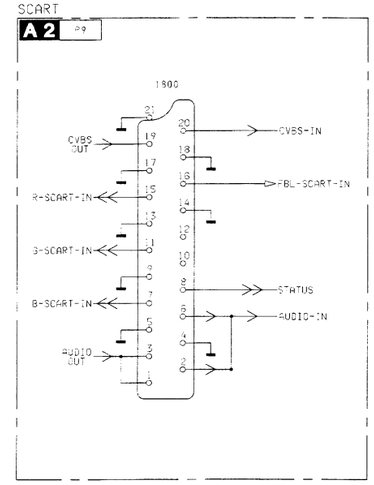
CONTROL/Bedienung/COMMANDE

A4 P9



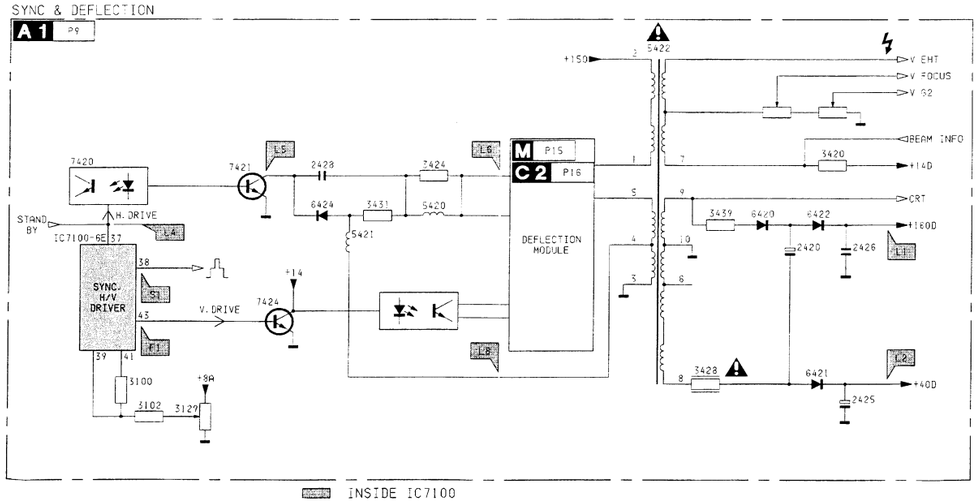
SCART

A2 P9



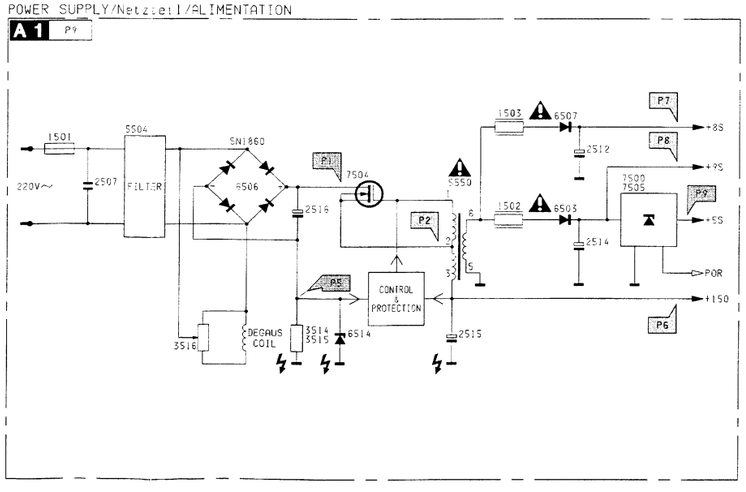
SYNC & DEFLECTION

A1 P9

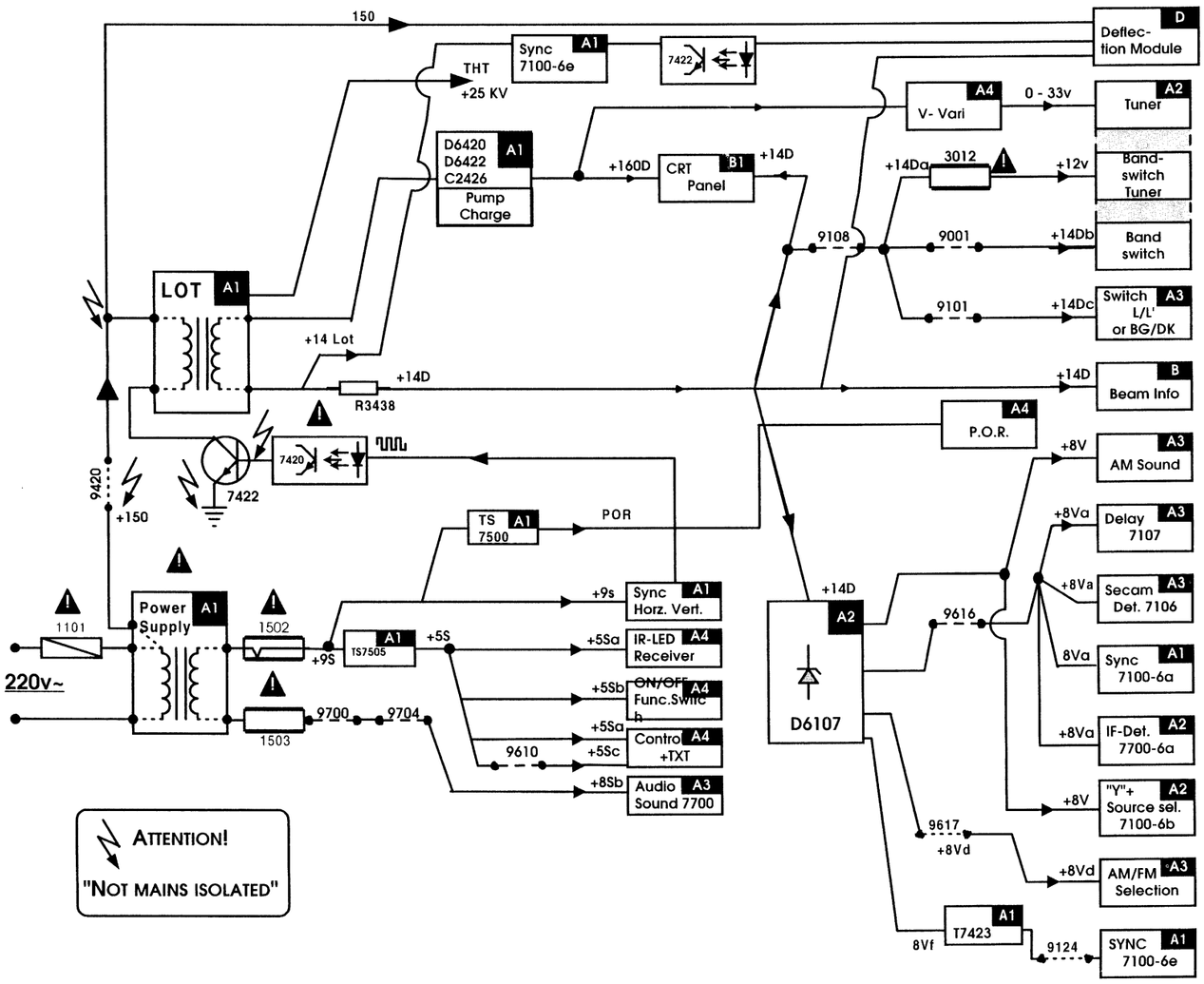


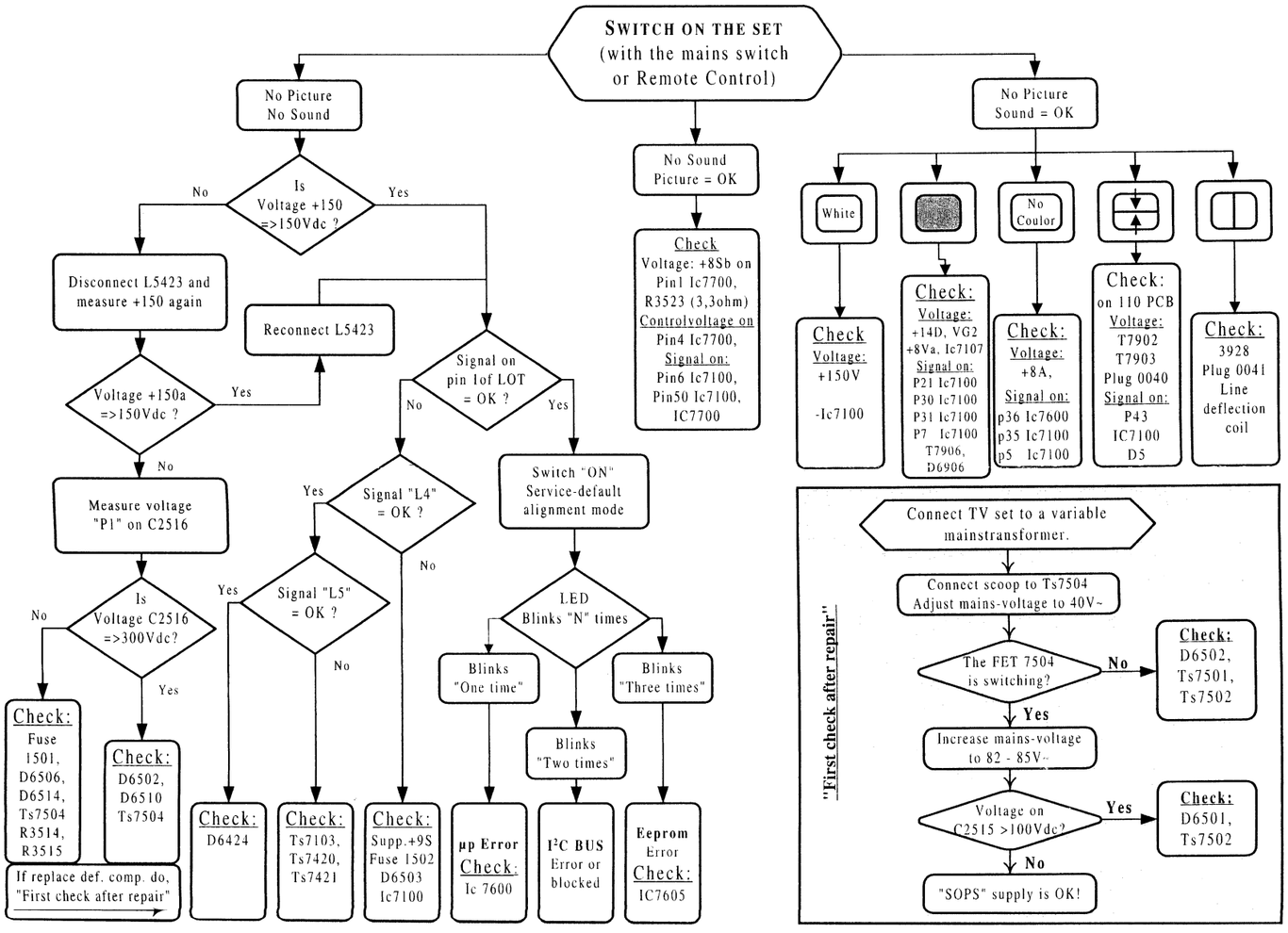
POWER SUPPLY/Netzteil/ALIMENTATION

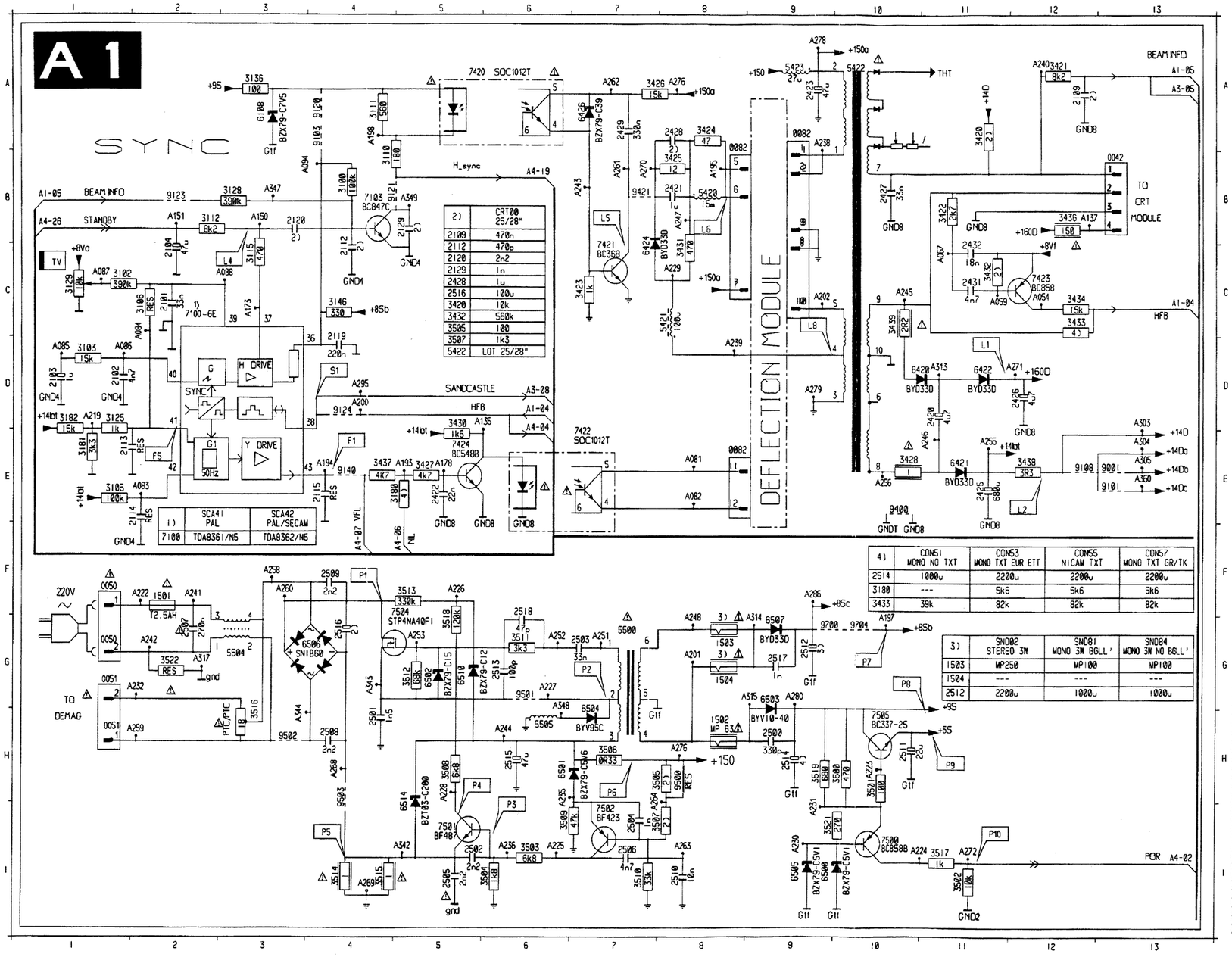
A1 P9



INSIDE IC7100


150
Sync A1 7100-6e
7422
Deflec- tion Module D
THT +25 KV
V- Vari A4
0 - 33v
Tuner A2
D6420 D6422 C2426 Pump Charge A1
+160D
CRT Panel B1
+14D
+14Da
3012
+12v
Band- switch Tuner
9108
9001
+14Db
Band switch
9101
+14Dc
Switch L/L' or BG/DK A3
LOT A1
+14 Lot
+14D
R3438
Beam Info B
P.O.R. A4
7420
7422
9420
+150
TS 7500 A1
POR
+8V
AM Sound A3
+8Va
Delay 7107 A3
+8Va
Secam Det. 7106 A3
8Va
Sync 7100-6a A1
+8Va
IF-Det. 7700-6a A2
+8V
"V"+ Source sel. 7100-6b A2
9617
+8Vd
+8Vd
AM/FM Selection A3
8Vf
T7423 A1
9124
SYNC 7100-6e A1
Power Supply A1
1101
1502
1503
220v~
TS7505 A1
+5S
+9S
+9s
Sync Horz. Vert. A1
+5Sa
IR-LED Receiver A4
+5Sb
ON/OFF Func.Switch A4
+5Sa
+5Sc
Control +TXT A4
+8Sb
Audio Sound 7700 A3
9700
9704
9610
+14D
A2
D6107
9616
ATTENTION!
"NOT MAINS ISOLATED"


SWITCH ON THE SET (with the mains switch or Remote Control)
No Picture No Sound
No Sound Picture = OK
No Picture Sound = OK
Is Voltage +150 =>150Vdc ?
No
Yes
Disconnect L5423 and measure +150 again
Reconnect L5423
Voltage +150a =>150Vdc ?
Yes
No
Measure voltage "P1" on C2516
Is Voltage C2516 =>300Vdc?
Check: Fuse 1501, D6506, D6514, Ts7504 R3514, R3515
Check: D6502, D6510 Ts7504
If replace def. comp. do, "First check after repair"
Signal on pin 1of LOT = OK ?
Signal "L4" = OK ?
Signal "L5" = OK ?
Check: D6424
Check: Ts7103, Ts7420, Ts7421
Check: Supp.+9S Fuse 1502 D6503 Ic7100
Switch "ON" Service-default alignment mode
LED Blinks "N" times
Blinks "One time"
Blinks "Two times"
Blinks "Three times"
µp Error Check: Ic 7600
I²C BUS Error or blocked
Eeprom Error Check: IC7605
Check Voltage: +8Sb on Pin1 Ic7700, R3523 (3,3ohm) Controlvoltage on Pin4 Ic7700, Signal on: Pin6 Ic7100, Pin50 Ic7100, IC7700
White
Check Voltage: +150V -Ic7100
Check: Voltage: +14D, VG2 +8Va, Ic7107 Signal on: P21 Ic7100 P30 Ic7100 P31 Ic7100 P7 Ic7100 T7906, D6906
No Coulor
Check: Voltage: +8A, Signal on: p36 Ic7600 p35 Ic7100 p5 Ic7100
Check: on 110 PCB Voltage: T7902 T7903 Plug 0040 Signal on: P43 IC7100 D5
Check: 3928 Plug 0041 Line deflection coil
"First check after repair"
Connect TV set to a variable mainstransformer.
Connect scoop to Ts7504 Adjust mains-voltage to 40V~
The FET 7504 is switching?
No
Check: D6502, Ts7501, Ts7502
Yes
Increase mains-voltage to 82 - 85V~
Voltage on C2515 >100Vdc?
Yes
Check: D6501, Ts7502
No
"SOPS" supply is OK!



F1
2V / div DC
5ms / div

P1 320V DC

L1 140.3V DC

L2 13.6V DC

L3 39V DC

P2
50V / div DC
5µs / div

L4
500mV / div DC
10µs / div

P3
100mV / div DC
5µs / div

L5
1V / div DC
10µs / div

P4
50V / div DC
5µs / div

L6
500mV / div DC
10µs / div

P5
2V / div DC
5ms / div

L7
100V / div DC
10µs / div

P6
2V / div DC
5ms / div

L8
10V / div DC
10µs / div

P7 10.3V DC

P8 10.2V DC

P9 5.4V DC

S1
1V / div DC
10µs / div

= 0V

OSC_A1.AI

A2

3)	TUN60 U	TUN62 U+V+S	TUN63 U+V+S+H
1000	US43	UV917	UV915E
3001	---	2k2	2k2
3002	---	2k2	2k2
3003	---	5k6	6k8
3004	---	5k6	6k8
3007	---	220k	220k
3013	---	47k	47k
3014	---	220k	220k
4002	50m	---	---
7000	---	BC858C	BC858C
7001	---	BC858C	BC858C
7002	---	BC858C	BC858C

1)	CRT00 25/28"
3144	RES

2)	SCA41 PAL	SCA42 PAL/SECAM
2806	---	680p
7100	TDA8361/N5	TDA8362/N5
7109	BC848B	BC848C

0020	F 6	7100	H 9	A352	H 9
0020	F 6	7100	C 7	A355	J 3
0020	F 6	7105	D10	A359	F 4
0020	F 6	7108	G 4	A362	K 8
0020	F 6	7109	I 9	A363	J10
0020	F 6	7150	B 9	A4-09	J 5
0020	F 6	7804	K 4	A4-10	E12
0020	F 6	9000	D 6	A4-11	K 5
0065	I 6	9002	K11	A4-15	C12
0065	I 6	9100	K 2	A4-23	I 5
0130	G 1	9102	I 6	A4-24	I 5
1000	D 1	9107	J 4	A4-24	B12
1001	D 6	9109	H 6	A4-25	C 5
1102	E11	9113	K 9	A4-27	E12
1810	H 2	9114	K10	A4-28	J 5
1811	H 3	9116	G11	A4-29	C 5
1812	I 1	9117	G11	A4-30	C 5
1813	I 1	9118	K 8	A4-32	C 5
2000	E 3	9126	C10	A4-37	K 5
2001	E 2	9127	K 8	A4-37	I 8
2003	D 5	9160	K10	A4-40	J 8
2005	D 3	9423	F12	A4-43	J 5
2100	C10	9601	J 6	A4-45	J 5
2105	H12	9602	K 6	A4-46	K 5
2108	E 8	9607	K 6	MCE1	D 6
2132	G11	9703	K 9		
2136	I10	A045	G12		
2137	H12	A046	J 2		
2139	H 9	A057	J 6		
2140	H 9	A058	K 6		
2142	F 7	A069	K 6		
2143	C 8	A071	J 6		
2144	G 4	A072	J 6		
2145	J11	A078	E 8		
2147	J11	A089	C 9		
2148	E 6	A090	F12		
2150	B 8	A110	E10		
2151	C 9	A111	D10		
2152	B 9	A112	I10		
2153	C 8	A115	G11		
2161	H 4	A117	G 3		
2801	G 2	A118	K 3		
2802	H 3	A119	K 2		
2803	J 3	A120	I 2		
2806	G 3	A121	H 2		
2808	I 3	A122	I 2		
2813	G 2	A123	K 3		
3001	C 3	A127	H 9		
3002	C 3	A128	E 7		
3003	C 4	A129	E 6		
3024	C 4	A130	H 2		
3025	C 4	A131	H 2		
3026	C 4	A132	H 3		
3027	E 6	A133	H 2		
3028	E 6	A136	B 9		
3029	E 6	A153	I 9		
3010	E 5	A154	I 2		
3011	F 5	A155	G 1		
3012	E 2	A156	G 2		
3013	C 2	A158	G 4		
3014	D 2	A162	H 8		
3101	I 8	A163	D11		
3114	I11	A166	B 8		
3119	E10	A167	E 7		
3121	D10	A168	I11		
3122	E11	A169	C 8		
3123	C11	A170	D11		
3124	E11	A171	I 9		
3127	F 7	A177	J10		
3130	F 7	A179	C 3		
3131	G 4	A180	H 6		
3132	F 4	A182	C 3		
3133	G 3	A183	D 2		
3134	G11	A184	D 2		
3135	I 9	A185	D 1		
3141	G 3	A186	D 2		
3143	C 8	A187	C 5		
3144	F11	A188	C 4		
3150	B 8	A190	F 7		
3151	B10	A191	C 8		
3152	C 9	A192	C 9		
3622	I 4	A199	F 3		
3800	J 2	A2-10	E12		
3801	G 2	A2-10	J 5		
3802	H 3	A2-10	E12		
3803	H 4	A2-10	H 8		
3804	K 2	A2-11	K 5		
3805	I 4	A2-11	H 8		
3806	J 4	A2-13	I 5		
3807	H 3	A2-13	D 5		
3808	I 3	A2-14	H 5		
3810	I 3	A2-14	D12		
3811	I 2	A203	H 4		
3812	J 3	A206	I 4		
3813	H 9	A212	H 8		
3815	I 3	A213	I 6		
3816	J 3	A215	G 2		
3817	H 3	A218	E 2		
3820	K 2	A281	J 9		
3825	J 2	A283	E 5		
4001	J10	A3-09	J 5		
4002	D 1	A3-12	H 5		
4003	D 3	A3-13	D 5		
4004	D 3	A3-14	D12		
4800	H 1	A3-16	I 5		
4801	H 2	A3-17	H 5		
5100	C 8	A3-18	I 5		
5102	D 5	A3-21	J 5		
5103	D 5	A3-48	G 5		
6000	E 5	A3Ø9	G12		
6001	E 5	A310	I 1		
6106	G11	A311	J10		
6107	G11	A324	J 9		
6800	G 1	A328	K 9		
7000	C 3	A338	J 4		
7001	C 2	A339	D10		
7002	C 1	A351	D 6		

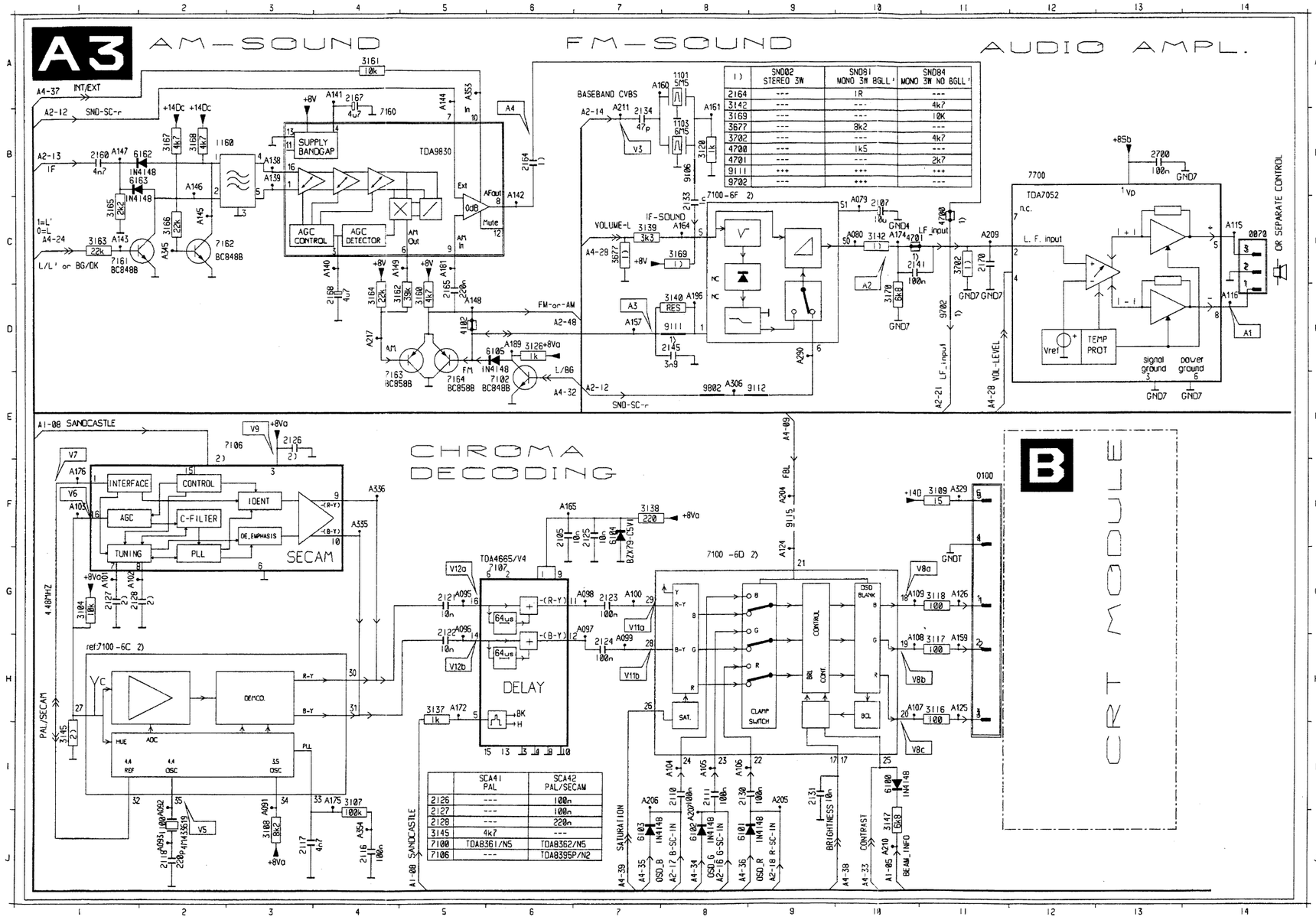
I1
50mV / div DC
10µs / div

I2
500mV / div AC
10µs / div

V1
500mV / div AC
10µs / div

V2
2V / div DC
5ms / div

OSC_A2.AI



A1
50mV / div AC
1ms / div

V11a
1V / div DC
20µs / div

A2
20mV / div AC
1ms / div

V11b
1V / div DC
20µs / div

A3
100mV / div AC
1ms / div

V12a
0.5V / div DC
20µs / div

V3
500mV / div AC
10µs / div

V12b
0.5V / div DC
20µs / div

V5
20mV / div AC
1µs / div

→ = 0V

V7 Secam (Only)

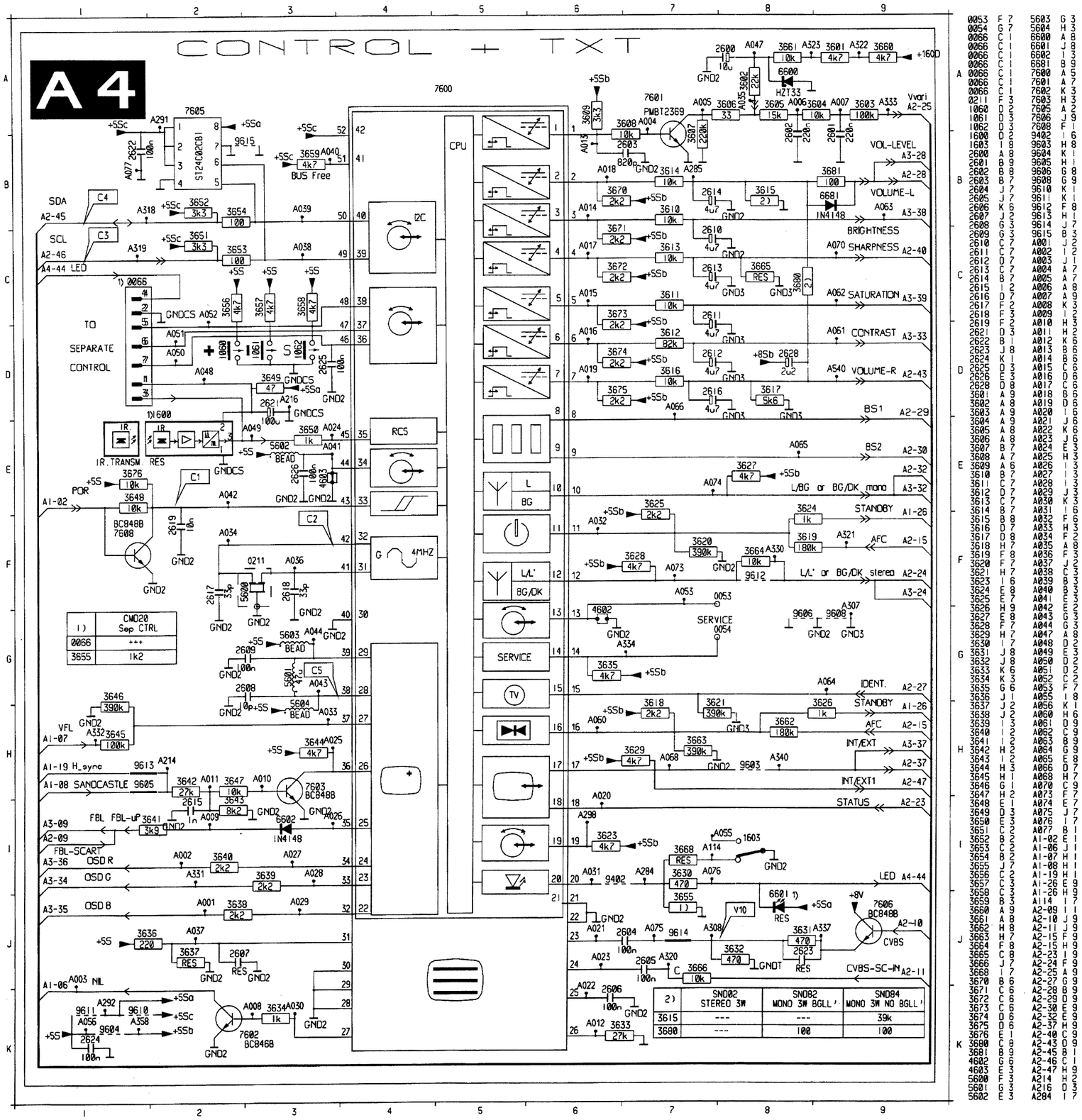
V9 8V6 DC

V8a
500mV / div DC
10µs / div

V8b
500mV / div DC
10µs / div

V8c
500mV / div DC
10µs / div

OSC_A3.AI



1)	CMD20 Sep CTRL
0066	+++
3655	1k2

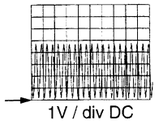
0053	F 7	5603	G 3	A285	B 7
0054	G 7	5604	H 3	A291	A 2
0066	C I	6600	A 8	A292	K I
0066	C I	6601	J 8	A298	I 6
0066	C I	6602	I 3	A3-09	I I
0066	C I	6681	B 9	A3-24	F 9
0066	C I	7600	A 5	A3-28	B 9
0066	C I	7601	A 7	A3-32	E 9
0066	C I	7602	K 3	A3-33	D 9
0211	F 3	7603	H 3	A3-34	I I
1060	D 2	7605	A 2	A3-35	J I
1061	D 2	7606	J 9	A3-36	I I
1062	D 3	7608	F I	A3-37	H 9
1600	D 2	9402	I 6	A3-38	B 9
1603	I 8	9603	H 8	A3-39	C 9
2600	A 8	9604	K I	A307	G 9
2601	B 9	9605	H I	A308	J 7
2602	B 8	9606	G 8	A318	B I
2603	B 7	9608	G 9	A319	C I
2604	J 7	9610	K I	A320	J 7
2605	J 8	9611	K I	A321	F 9
2606	K 6	9612	F 8	A322	A 9
2607	J 2	9613	H I	A323	A 8
2608	G 3	9614	J 7	A330	F 8
2609	G 3	9615	B 3	A331	I 2
2610	C 7	A001	J 2	A332	H I
2611	C 7	A002	J 2	A333	A 9
2612	D 7	A003	J I	A334	G 7
2613	C 7	A004	A 7	A337	J 9
2614	B 7	A005	A 7	A340	H 8
2615	I 2	A006	A 8	A358	K I
2616	D 7	A007	A 9	A4-44	I 9
2617	F 2	A008	K 3	A4-44	C I
2618	F 3	A009	I 2	A540	D 9
2619	F 2	A010	H 3		
2621	D 3	A011	H 2		
2622	B I	A012	K 6		
2623	J 8	A013	B 6		
2624	K I	A014	B 6		
2625	D 3	A015	C 6		
2626	D 8	A016	D 6		
2628	E 8	A017	C 6		
3601	A 9	A018	B 6		
3602	A 8	A019	D 6		
3603	A 9	A020	I 6		
3604	A 9	A021	J 6		
3605	A 8	A022	K 6		
3606	A 8	A023	J 6		
3607	B 7	A024	E 3		
3608	A 7	A025	H 3		
3609	A 6	A026	I 3		
3610	A 7	A027	I 3		
3611	A 7	A028	I 3		
3612	D 7	A029	J 3		
3613	C 7	A030	K 3		
3614	B 7	A031	I 6		
3615	B 8	A032	F 6		
3616	D 7	A033	H 3		
3617	D 8	A034	F 2		
3618	H 7	A035	A 8		
3619	F 8	A036	F 3		
3620	F 7	A037	J 2		
3621	H 7	A038	C 3		
3623	I 6	A039	B 3		
3624	E 8	A040	B 3		
3625	E 7	A041	E 3		
3626	H 9	A042	E 2		
3627	E 8	A043	G 3		
3628	F 7	A044	G 3		
3629	H 7	A047	A 8		
3630	I 7	A048	D 2		
3631	J 8	A049	E 3		
3632	J 8	A050	D 2		
3633	K 6	A051	D 2		
3634	K 3	A052	C 2		
3635	G 6	A053	F 7		
3636	J I	A055	E 8		
3637	J 2	A056	K I		
3639	J 2	A060	H 6		
3639	I 3	A061	D 9		
3640	I 2	A062	C 9		
3641	I 2	A063	B 9		
3642	H 2	A064	G 9		
3643	I 2	A065	E 8		
3644	H 3	A066	D 7		
3645	H I	A068	H 7		
3646	G I	A070	C 9		
3647	H 2	A073	F 7		
3648	E I	A074	E 7		
3649	D 3	A075	J 7		
3650	E 3	A076	I 7		
3651	C 2	A077	B I		
3652	B 2	A1-02	E I		
3653	C 9	A1-06	J I		
3654	B 2	A1-07	H I		
3655	J 2	A1-08	H I		
3656	C 2	A1-19	H I		
3657	C 3	A1-26	E 9		
3658	C 3	A1-26	H 9		
3659	B 3	A114	I 7		
3660	A 9	A2-09	I I		
3661	A 8	A2-10	J 9		
3662	H 8	A2-11	J 9		
3663	H 7	A2-15	F 9		
3664	F 8	A2-15	H 9		
3665	C 8	A2-23	I 9		
3666	J 7	A2-24	F 9		
3668	I 7	A2-25	A 9		
3670	B 6	A2-27	G 9		
3671	C 6	A2-28	B 9		
3672	C 6	A2-29	D 9		
3673	C 6	A2-30	E 9		
3674	D 6	A2-32	E 9		
3675	D 6	A2-37	H 9		
3676	E I	A2-40	C 9		
3680	C 8	A2-43	D 9		
3681	B 9	A2-45	B I		
4602	G 6	A2-46	C I		
4603	E 3	A2-47	H 9		
5600	F 3	A214	H 2		
5601	G 3	A216	D 3		
5602	E 3	A284	I 7		

C1 5V DC

C3 5V DC

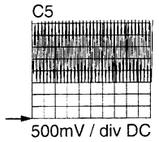
C4 5V DC

C2



1V / div DC
0.5µs / div

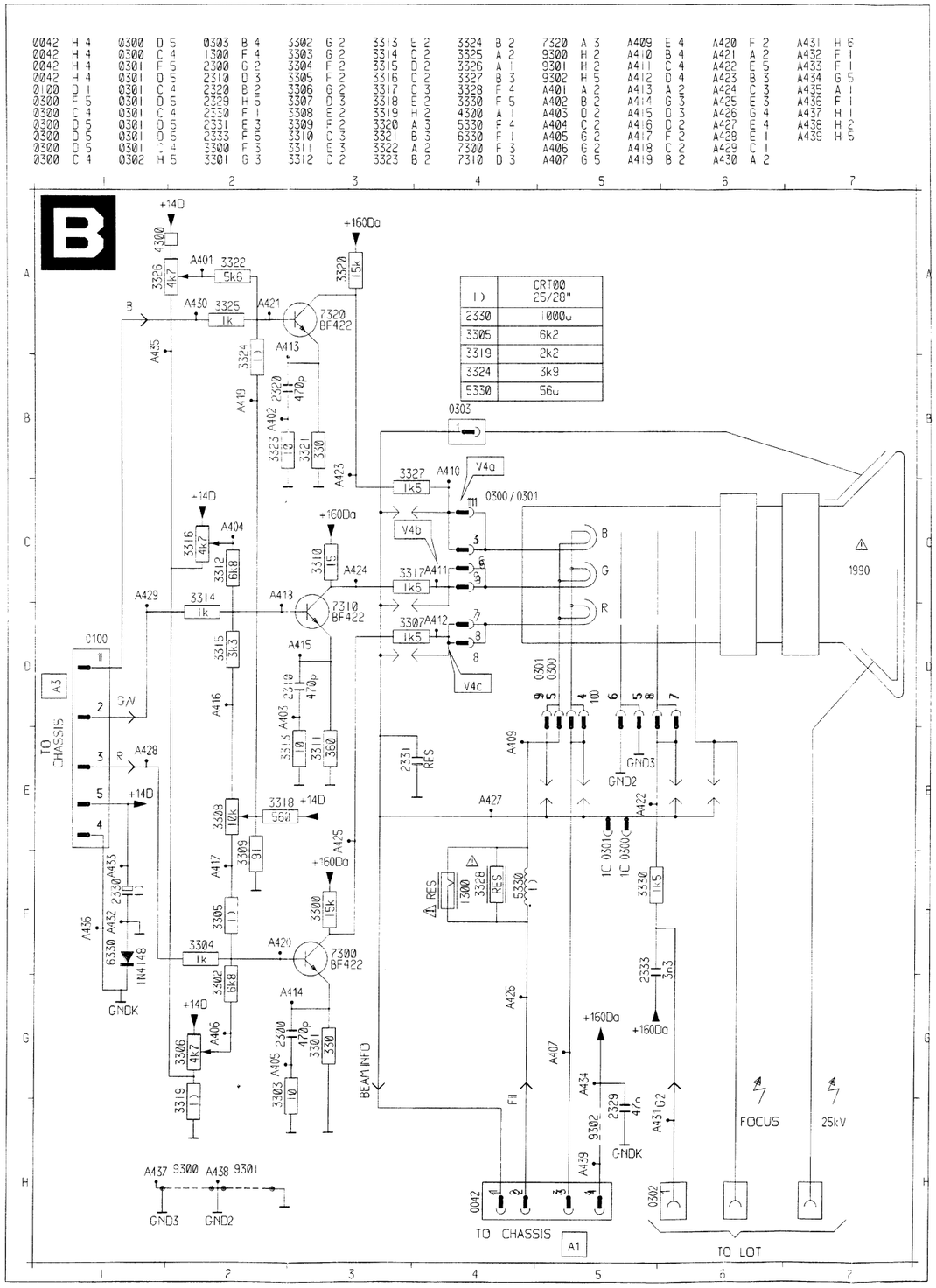
C5

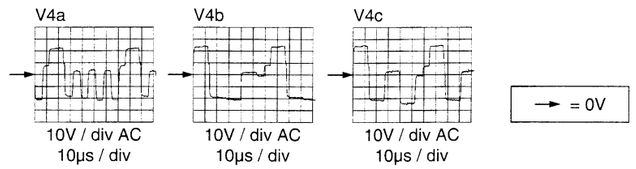


500mV / div DC
0.5µs / div

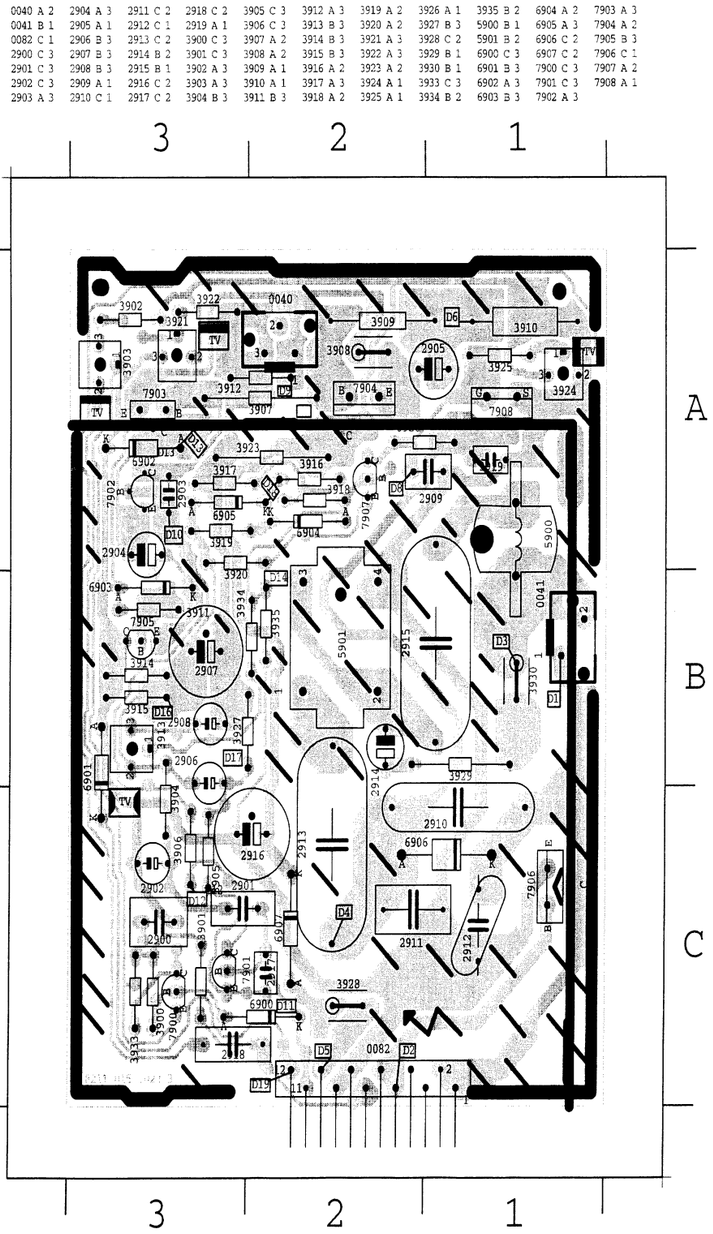
= 0V

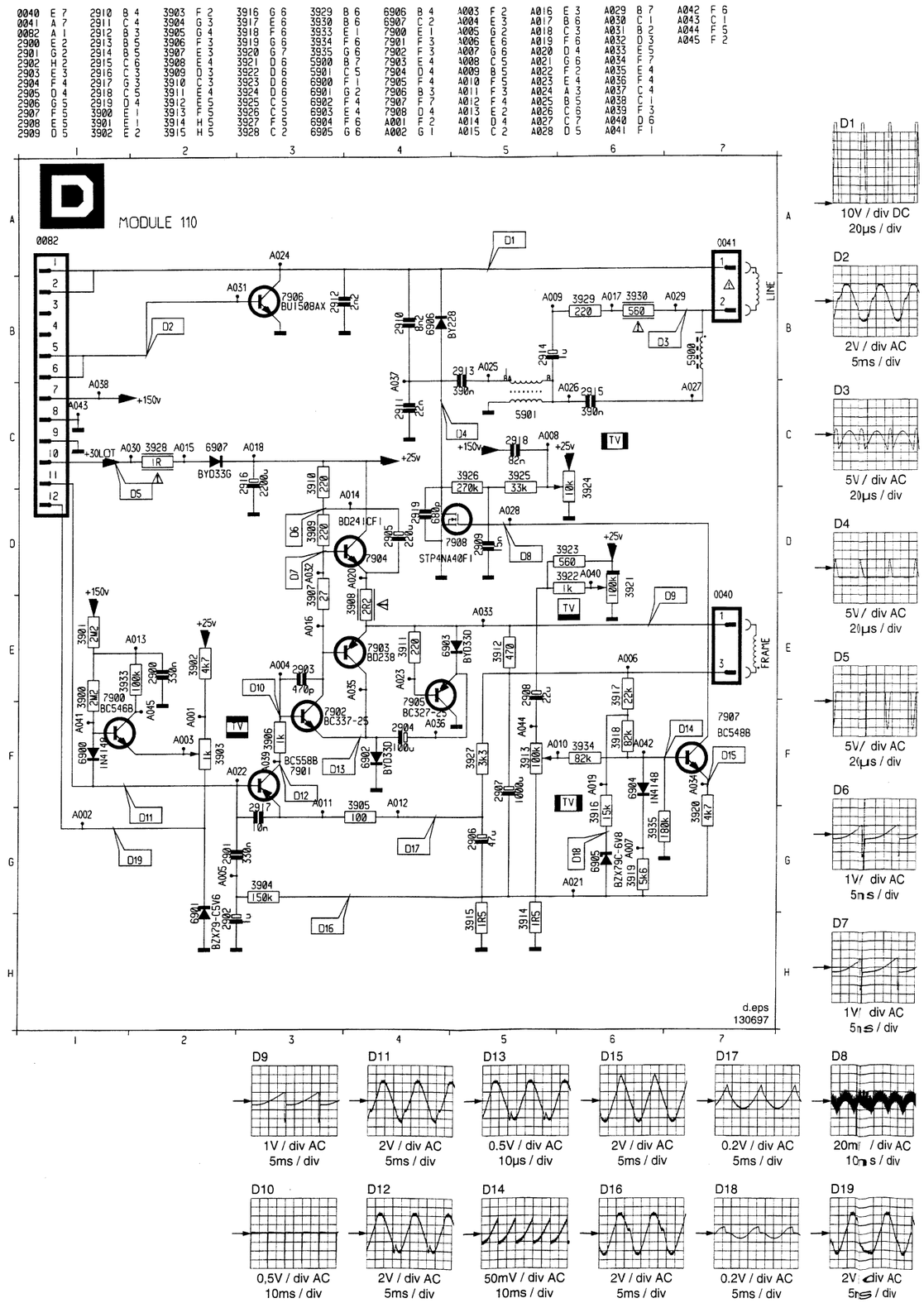
OSC_A4.AI





I)	CRT00 25/28"
2330	1000u
3305	6k2
3319	2k2
3324	3k9
5330	56u


0040 A 2 2904 A 3 2911 C 2 2918 C 2 3905 C 3 3912 A 3 3919 A 2 3926 A 1 3935 B 2 6904 A 2 7903 A 3
0041 B 1 2905 A 1 2912 C 1 2919 A 1 3906 C 3 3913 B 3 3920 A 2 3927 B 3 5900 B 1 6905 A 3 7904 A 2
0082 C 1 2906 B 3 2913 C 2 3900 C 3 3907 A 2 3914 B 3 3921 A 3 3928 C 2 5901 B 2 6906 C 2 7905 B 3
2900 C 3 2907 B 3 2914 B 2 3901 C 3 3908 A 2 3915 B 3 3922 A 3 3929 B 1 6900 C 3 6907 C 2 7906 C 1
2901 C 3 2908 B 3 2915 B 1 3902 A 3 3909 A 1 3916 A 2 3923 A 2 3930 B 1 6901 B 3 7900 C 3 7907 A 2
2902 C 3 2909 A 1 2916 C 2 3903 A 3 3910 A 1 3917 A 3 3924 A 1 3933 C 3 6902 A 3 7901 C 3 7908 A 1
2903 A 3 2910 C 1 2917 C 2 3904 B 3 3911 B 3 3918 A 2 3925 A 1 3934 B 2 6903 B 3 7902 A 3
3
2
1
A
B
C
A
B
C
3
2
1


0040 E 7 2910 B 4 3903 F 2 3916 G 6 3929 B 6 6906 B 4 A003 F 2 A016 E 3 A029 B 7 A042 F 6
0041 A 7 2911 C 4 3904 G 3 3917 E 6 3930 B 6 6907 C 2 A004 E 3 A017 B 6 A030 C 1 A043 C 1
0082 A 1 2912 B 3 3905 G 4 3918 F 6 3933 E 1 7900 E 1 A005 G 2 A018 C 5 A031 B 2 A044 F 5
2900 E 2 2913 B 5 3906 F 3 3919 G 6 3934 F 6 7901 F 3 A006 E 6 A019 F 6 A032 D 5 A045 F 2
2901 G 2 2914 B 6 3907 E 3 3920 G 7 3935 B 7 7902 F 3 A007 G 6 A020 D 4 A033 E 5
2902 H 2 2915 C 3 3908 E 4 3921 D 6 5900 C 5 7903 E 4 A008 C 5 A021 G 6 A034 F 7
2903 E 3 2916 C 3 3909 D 3 3922 D 6 5901 C 5 7904 D 4 A009 B 5 A022 F 2 A035 E 4
2904 F 4 2917 G 3 3910 C 3 3923 D 6 6900 F 1 7905 F 4 A010 F 5 A023 E 4 A036 F 4
2905 D 4 2918 C 5 3911 E 4 3924 D 6 6901 G 2 7906 B 3 A011 F 3 A024 A 3 A037 C 4
2906 G 5 2919 D 4 3912 F 5 3925 C 5 6902 F 4 7907 F 7 A012 F 4 A025 B 5 A038 C 1
2907 F 5 3900 E 1 3913 F 5 3926 C 5 6903 E 4 7908 D 4 A013 E 2 A026 C 5 A039 F 3
2908 E 5 3901 E 1 3914 H 5 3927 F 5 6904 F 6 A001 F 2 A014 D 4 A027 C 5 A040 D 6
2909 D 5 3902 E 2 3915 H 5 3928 C 2 6905 G 6 A002 G 1 A015 C 2 A028 D 5 A041 F 1
1
2
3
4
5
6
7
A
B
C
D
E
F
G
H
MODULE 110
0082
0041
LINE
FRAME
D1
D2
D3
D4
D5
D6
D7
D8
D9
D10
D11
D12
D13
D14
D15
D16
D17
D18
D19
A024
A031
7906 BU1508AX
2912 2n2
2910 6n2
6906 BY228
A009 3929 220
A017 3930 560
A029
2914 3
5900
A037
2911 22n
2913 390n
A025
5901
A026 2915 390n
A027
A038
+150v
A043
+30LOT
A030 3928 1R
A015 6907 BYD33G
A018
+25v
2916 2200u
3910 220
A014
BD241CF1
7904
STP4NA40FI
2905 220u
2919 680n
7908
2909 15n
A028
3926 270k
3925 33k
3924 10k
2918 82n
A008
+150v
+25v
TV
3923 560
3922 A040 1k
3921 100k
A032
3907
27
A016
3908 2R2
A033
7903 BD238
3911 220
6903 BYD330
3912 470
A006
3901 2R2
+150v
A013
3933 100k
2900 330n
7900 BC546B
A045
A041 3909 2R2
6900 1N4148
3902 4k7
+25v
A001
1k
3903
A003
A004 2903 470p
A035
7902 BC337-25
A023
7905 BC327-25
A036
2904 100u
3906 1k
BC558B 7901
A039
A022
2917 10n
A011
3905 100
A012
3927 3k3
2907 1000u
A044
3913 100k
A010 3934 82k
A042
7907 BC548B
3918 22k
3917 22k
2908 22u
A019
3916 15k
6904 1N4148
3935 180k
3920 4k7
A034
A007
6905 BZX79C-6V8
3919 5k6
A021
D18
D19
A002
6901 BZX79-C5V6
2902 1u
3904 150k
2906 47u
3915 1R5
3914 1R5
D16
D17
D11
D12
D13
D14
D15
d.eps
130697

D1
10V / div DC
20µs / div
D2
2V / div AC
5ms / div
D3
5V / div AC
20µs / div
D4
5V / div AC
20µs / div
D5
5V / div AC
20µs / div
D6
1V / div AC
5ns / div
D7
1V / div AC
5ns / div
D9
1V / div AC
5ms / div
D11
2V / div AC
5ms / div
D13
0.5V / div AC
10µs / div
D15
2V / div AC
5ms / div
D17
0.2V / div AC
5ms / div
D8
20mV / div AC
10ns / div
D10
0,5V / div AC
10ms / div
D12
2V / div AC
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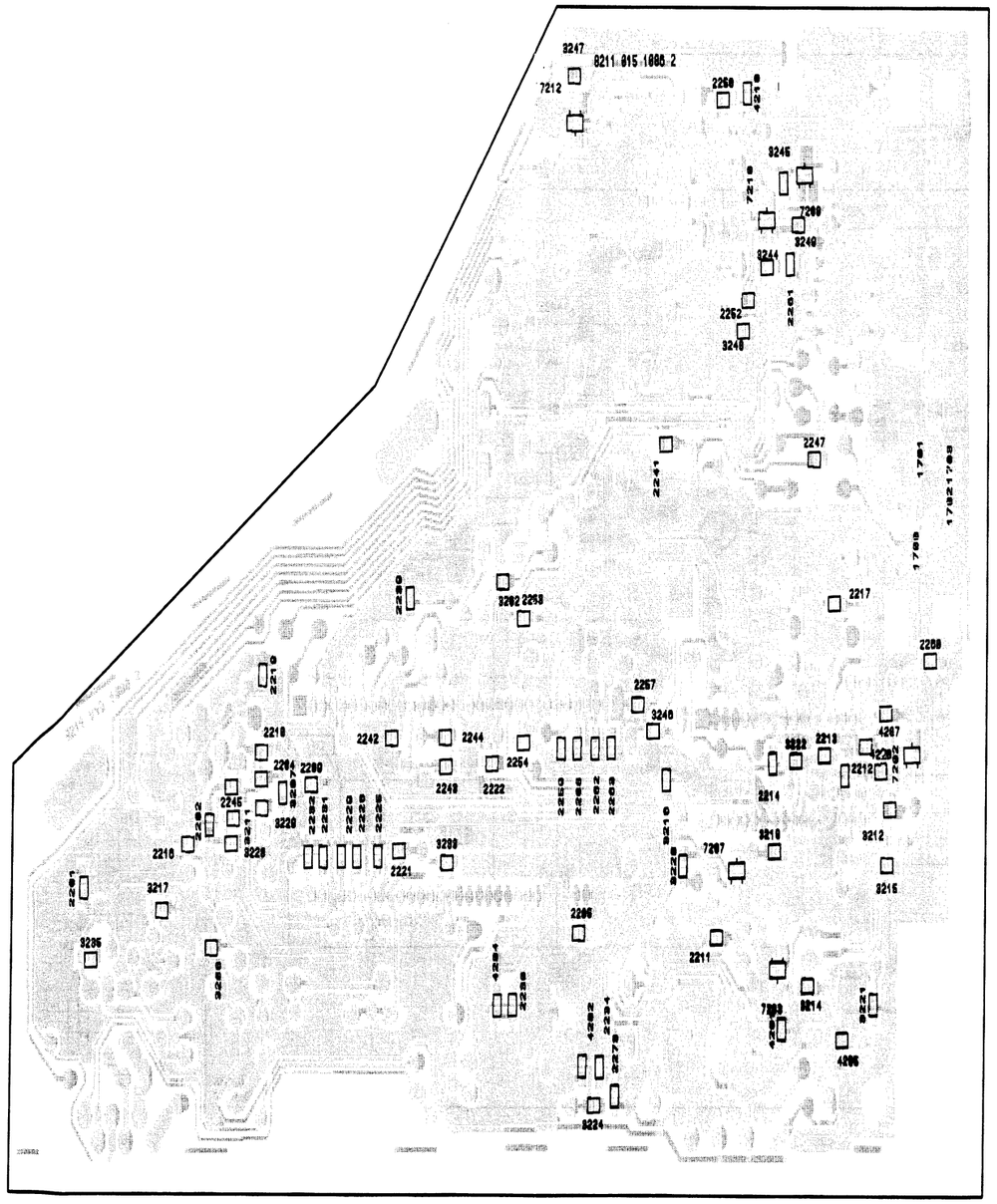
D19
2V / div AC
5ns / div



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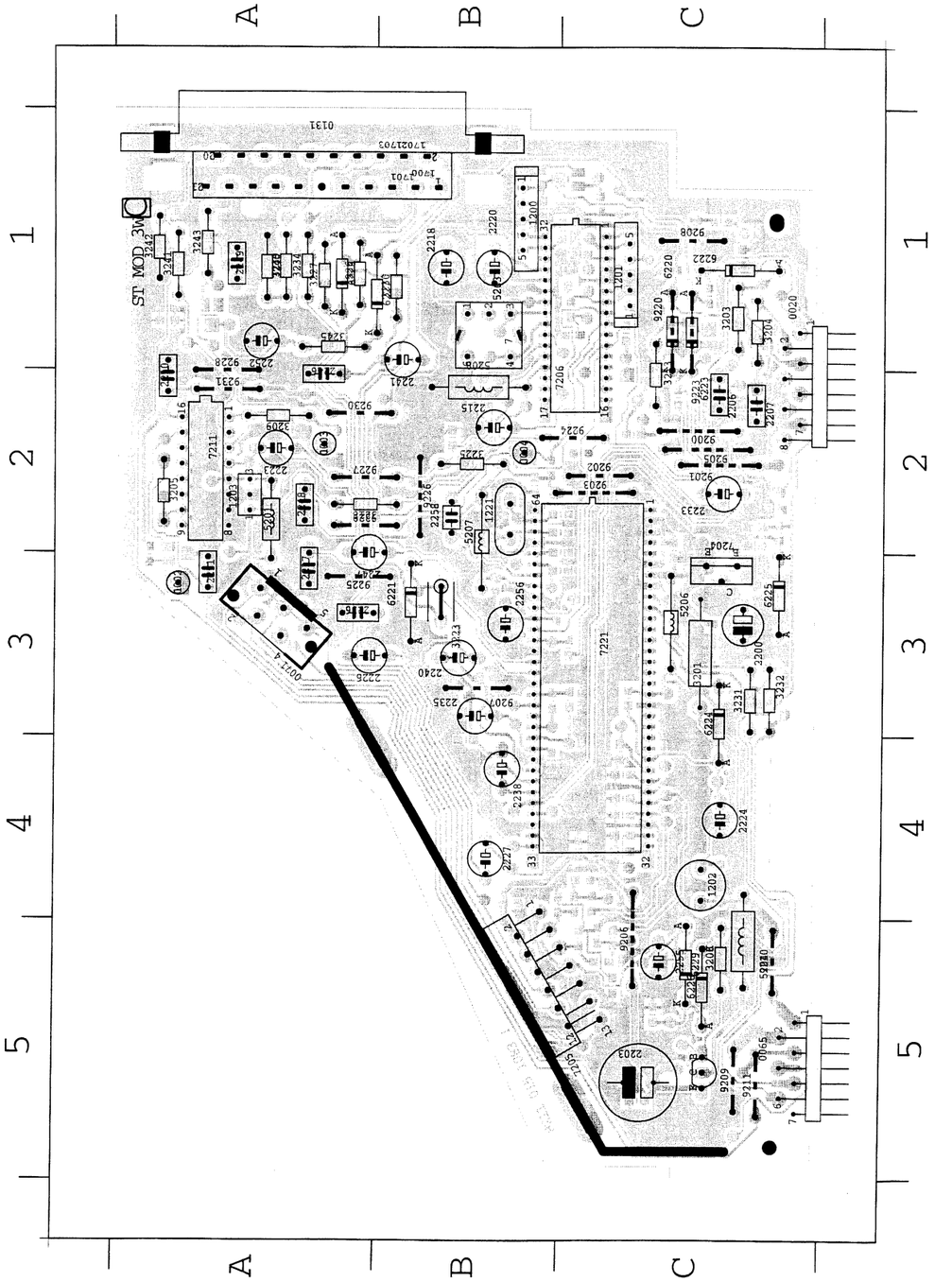

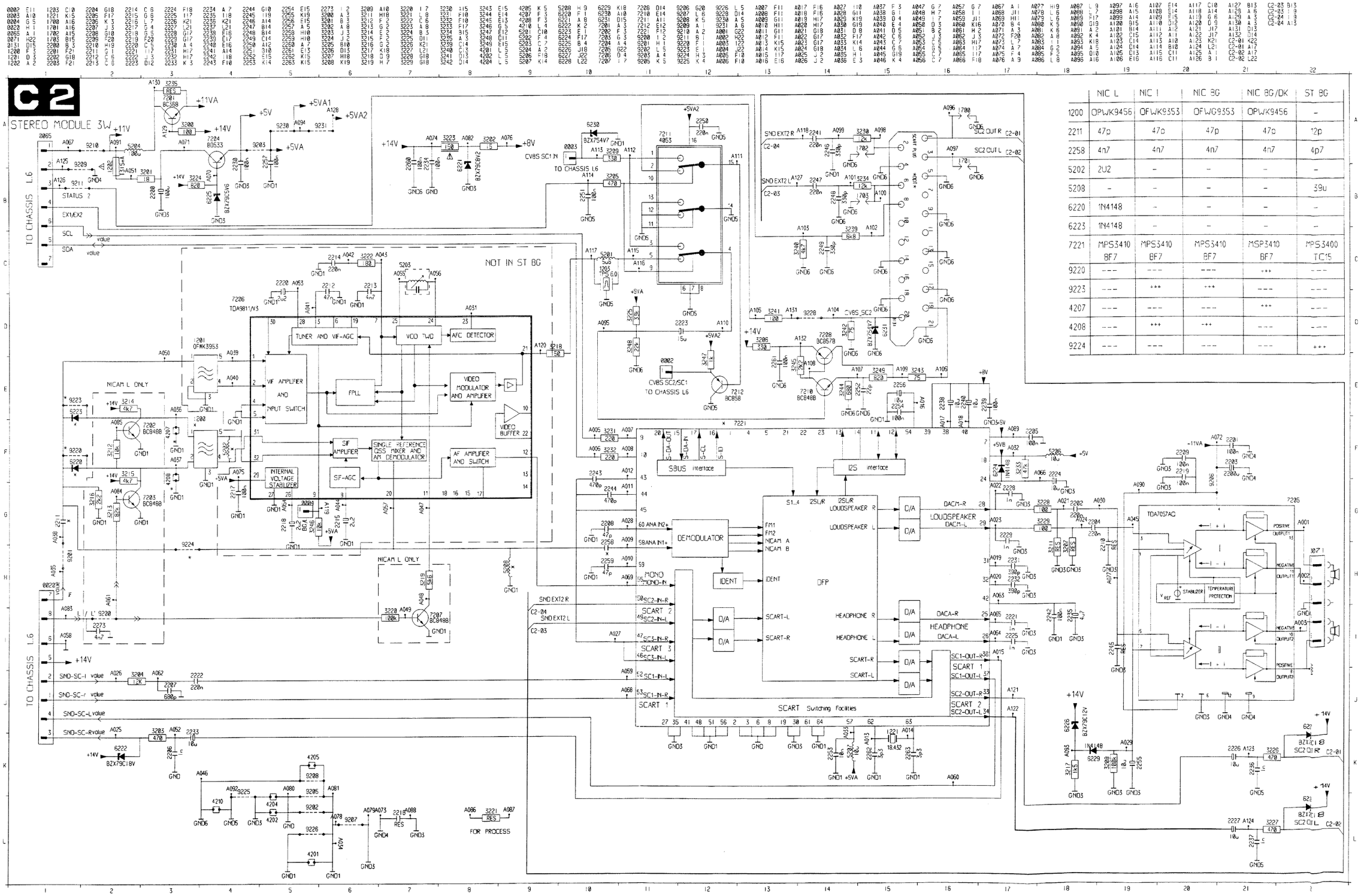

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2258	4n7	4n7	4n7	4n7	4p7
5202	2U2	-	-	-	-
5208	-	-	-	-	39u
6220	1N4148	-	-	-	-
6223	1N4148	-	-	-	-
7221	MPS3410 BF7	MPS3410 BF7	MPS3410 BF7	MSP3410 BF7	MPS3400 TC15
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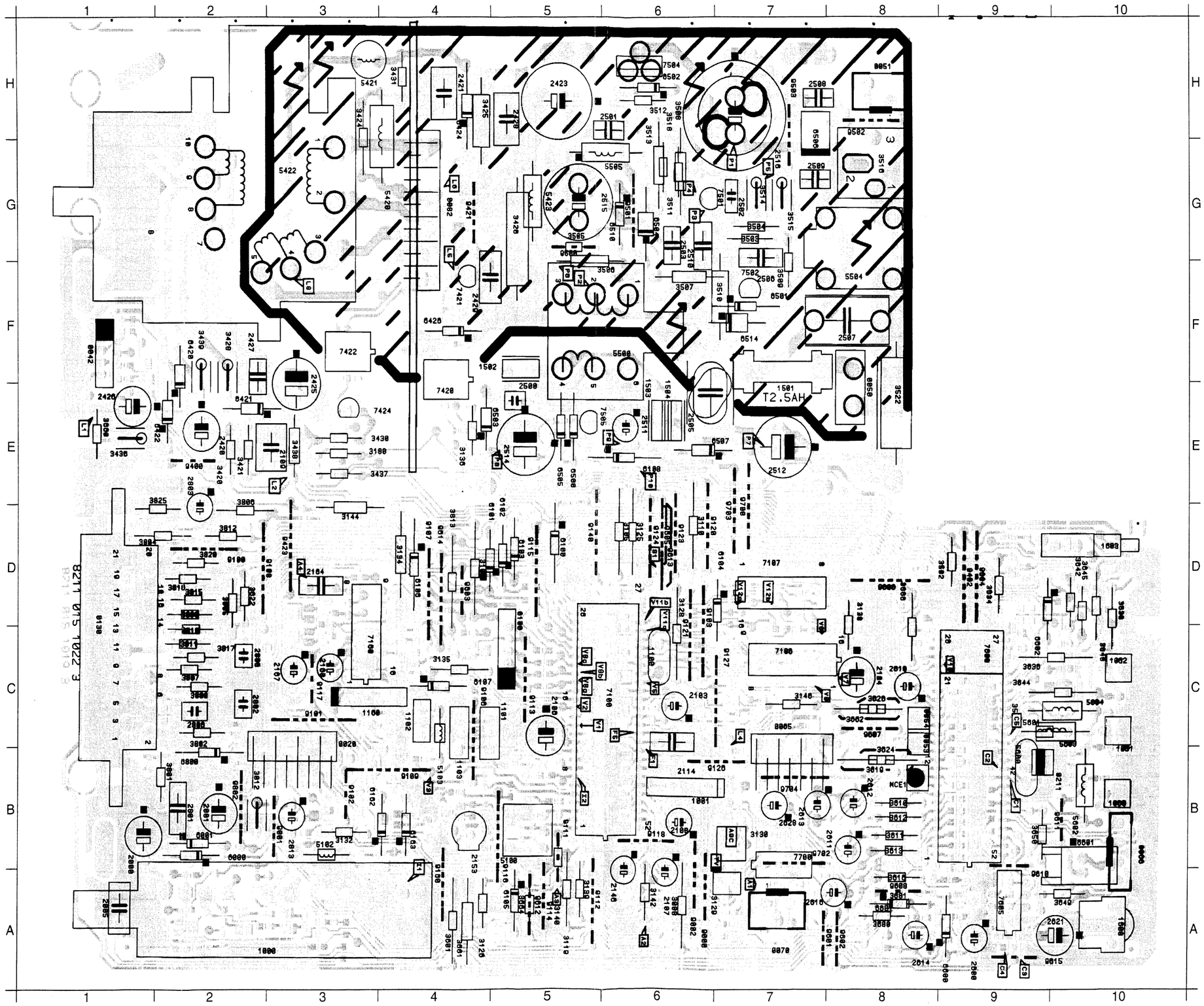
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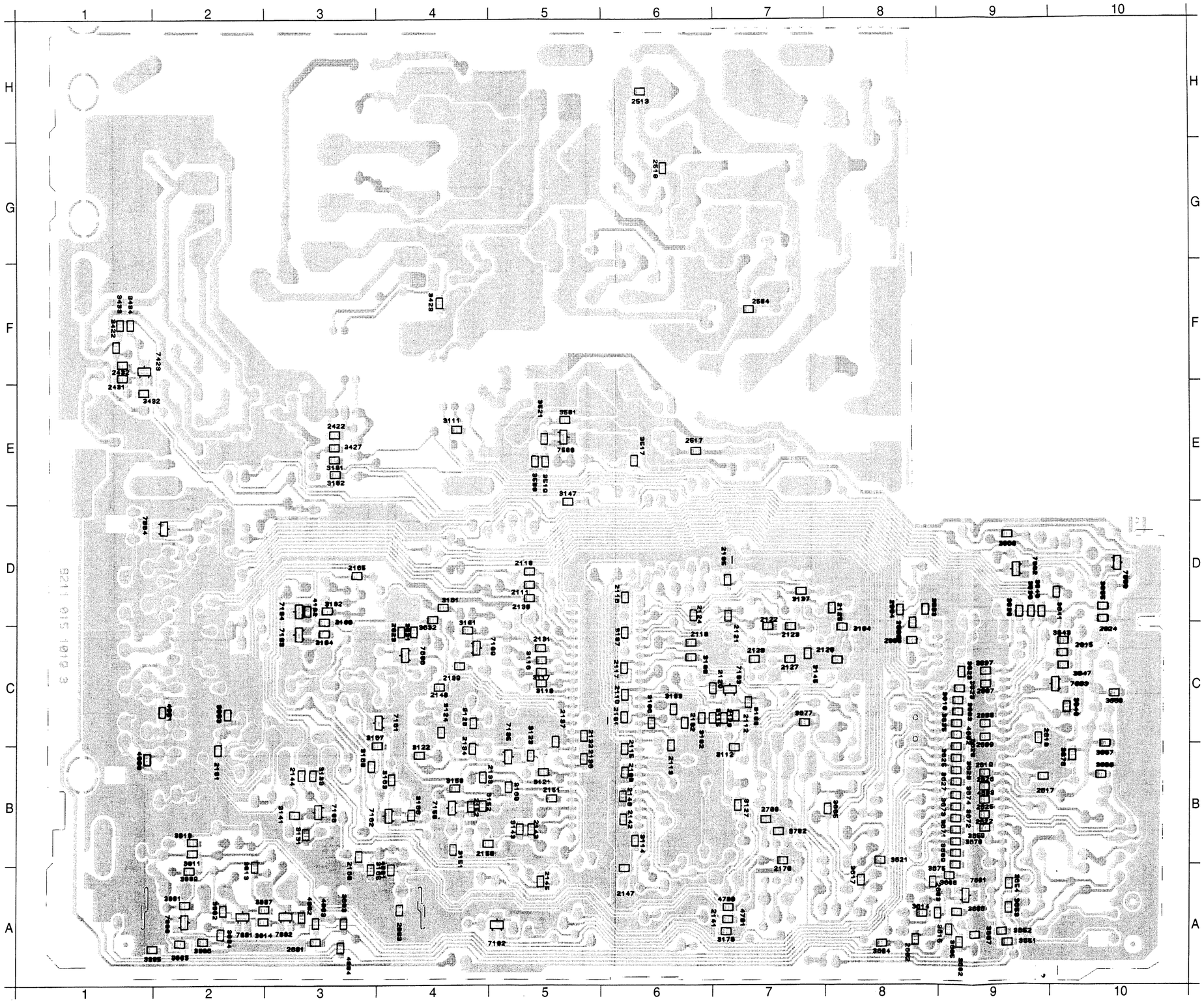
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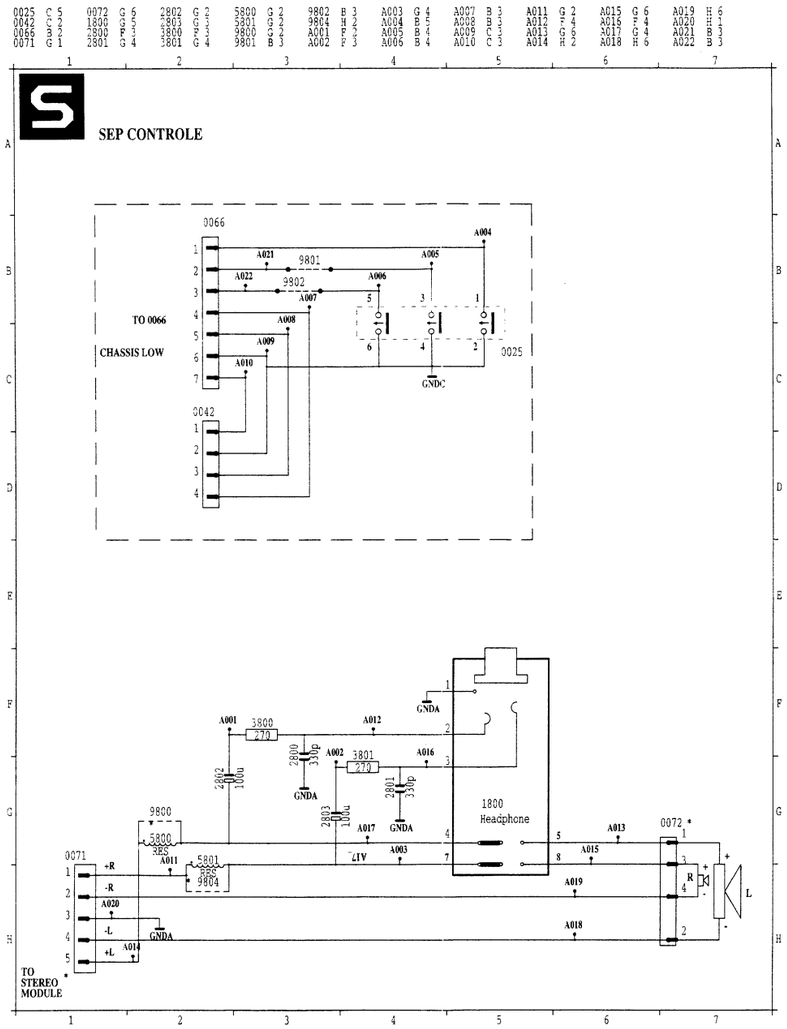
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SEP CONTROLE
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TO 0066
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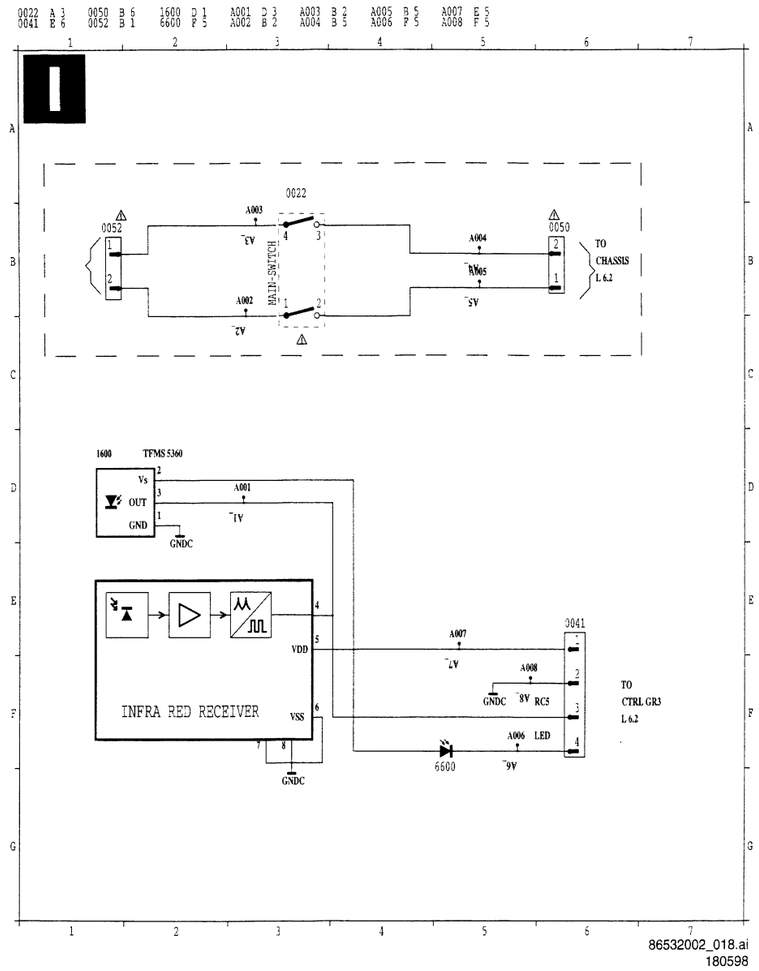
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MAIN-SWITCH
0052
0050
TO
CHASSIS
L 6.2
1600
TFMS 5360
Vs
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GNDC
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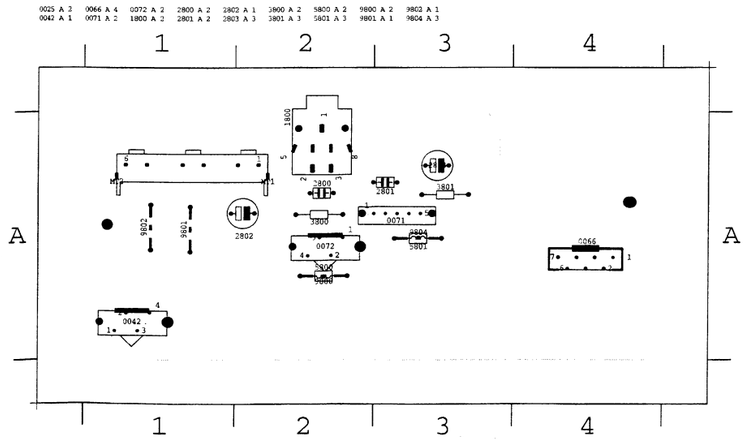
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9800 A 2 9801 A 1
9802 A 1 9804 A 3
1800
3800
3801
0071
9804
0072
5800
0042
2802
9802
0066

8 Electrical adjustments

8.1 Adjustments on the 110 module panel

1. Horizontal amplitude: Is adjusted with potentiometer R3924
2. Vertical centring: Is adjusted with potentiometer R3921
3. Picture height: Is adjusted with potentiometer R3903
4. East-west correction: Is adjusted by potentiometer R3913
5. Horizontal centring (main pcb):Is adjusted with potentiometer R3129 on the main PCB
6. Focusing: Is adjusted with the focusing potentiometer in the line output transformer
7. AFC
   - Adjustment of the AFC and picture demodulator (all versions).
   - Select a non secam L/L' system in the SDAM mode (negative modulation). Switch the tuner to HIGH BAND (pin 11 of tuner 1100 grounded). Connect a pattern generator to pin 17 of the tuner via a capacitor of 4.7nF and put a 82W resistor from the output of the generator to ground. Connect a DC voltmeter to pin 44 of IC7100. Adjust coil 5100 to get 3V5 on pin 44 of IC7100.
   - The signal of the generator has to be 38.9 MHz.
   - Adjustment of the AFC and picture demodulator. (BAND 1 L. France versions only).
   - Same story as a) only the frequency of the generator has to be 33.9Mhz with positive modulation.
8. RF AGC
9. If the picture of a strong local transmitter is reproduced distorted, adjust potentiometer R3130 until the picture is undistorted.
   or: Connect a pattern generator (e.g. PM5518) to the aerial input with RF signal amplitude = 1mV. Connect a multimeter (DC) at pin 5 of the tuner. Adjust R3130 so that voltage at pin 5 of the tuner is 8V5 +/- 0V5 DC.

8.2 Adjustments on the CRT panel

VG2 cut-off points of picture tube

Apply a black CVBS signal at the input pin 20 of scart. Adjust the brightness in order to have 1.6V during the line at the R,G,B outputs of the BIMOS pin 18,19,20 of IC7100. Put potentiometers R3326, R3316 and R3306 to the minimum value (maximum voltage on the CRT cathodes). Adjust now VG2 till the colour that luminates first is not visible anymore. Adjust now the other two potentiometers in such a way that they just don't luminate.

Potentiometer R3308 should always be in the mid-position.

9 CIRCUIT DESCRIPTION

9.1 Description of the power supply:

9.1.1 General

Note: The voltages +96S and +96s are not mains isolated.

The power-supply used in this chassis is a self-oscillating down converter with an auxiliary winding to help the FET to switch.

9.1.2 Principle of the down-converter (Fig 8.1):

When switch TS7504 is closed, the voltage on L2-3 is Vin-Vout. During this time, energy is stored in the coil and energy is delivered to the load. When switch TS7504 opens, the energy stored in the coil will be stored in the output capacitor (C2515). This is due to the fact that the current through the coil has to decrease linear. When the switch is open the current is floating through D6504, L2-3 and C2515. By controlling the duty-cycle of the switch, the output voltage can be regulated.

9.1.3 Start-up (see diagram A1):

When the switch TS7504 is closed, the input voltage is placed over winding 2-3 of transformer 5500, which acts as coil L2-3 in Fig 8.1. Via resistors R3513,R3518 and R3512 the switch is turned on for the first time. Zener diode D6502 prevents that the Ugs of the FET becomes higher than 15V. When the input voltage is on winding 2-3, there is also a voltage on winding 1-2. Via winding 1-2 the correct switching voltage is obtained. The DC-part of this voltage is blocked by capacitor C2503. Diode D6510 acts as a protection in start-up and in short-circuit situations. During start-up the output capacitor C2515 is empty. It takes a relative long time to charge the gate to a voltage high enough to switch on the FET. This is due to the fact the diode D6510 is conducting. When this diode is conducting, the current that would normally flow into the gate of the fet to switch on the FET, is now flowing into C2515. In this way a smooth start-up is guaranteed.

9.1.4 General way of working (Fig 8.2):

The state of the power-supply can be divided into three areas:

- T-on;In this state the FET is conducting and energy is stored in the coil and in the output capacitor.
- T-off;In this state the fet is non conducting and the energy stored in the coil is fed to the output capacitor.
- T-dead;Fet is out of conduction and there is no energy in the coil.

T-on; In the T-on state, switch TS7540 is switched on. When the switch is on the voltage over resistors R3514-R3515 is a direct measure for the current through winding 2-3. This is a negative voltage. When this voltage becomes below a certain level, TS7501 starts conducting and will switch off the fet. In this way it is prevented that the coil can go into saturation. This could be the case when the output voltage is very low. (long on time of the FET). When the output-voltage becomes too high during T-on the FET will be switched off. (see Output-voltage regulation)
T-off; Due to the stored energy a current will start to flow through D6504, C2515 and winding 2-3. Due to the fact that the current is flowing through this circuit, a voltage with reverse polarity is on winding 1-2. In this way the fet remains off until the current through winding 2-3 reaches zero. Now a new cycle will start. The fet will be switched on and all starts over again.
T-dead; If the output voltage is too high (for example in a low load situation) the FET remains off till the output-voltage is not to high anymore.

9.1.5 Output voltage regulation:

This is done by the circuit D6501, R3509, TS7502, R3505, R3507, R3510. Transistor TS7502 can only conduct when the voltage on the base is 0V7 lower than the voltage the voltage on the emitter. This means that the voltage drop over resistors R3505 and R3507 should be 5V6(zenerdiode) + 0V7(base-emitter). This is reached when the output voltage exceeds the 100V. Now transistor TS7502 starts conducting, which brings transistor TS7501 in conduction. As a consequence the gate voltage of the fet becomes very low and the fet stops conducting. As long as the output voltage is too high the fet stays out of conduction.

9.2 Protections:

9.2.1 Overvoltage protection:

A disadvantage of a down converter is that if the switch becomes a short-circuit, the output voltage will increase to the input voltage. This could damage circuits. In this power-supply there is a protection to prevent this. If the output voltage becomes higher than 130V, zenerdiode D6514 starts to conduct. The Vin will be short circuited. This will blown the main fuse 1501 and protect in this way all the other circuits.

9.2.2 Short-circuit and start-up protection:

The short-circuit protection works the same as the start-up protection. If the output-voltage is very low in case of a start-up or a short-circuit condition, The gate will be charged very slowly due to the fact that zenerdiode D6510 is conducting. So the current is not only charging the gate but is also flowing into the output capacitor. In this way it takes a few milliseconds to switch on the fet. Diode D6510 takes also care that the fet never remains in his power consuming (linear) area.

9.2.3 Undervoltage protection

If the output voltage is very low, it also takes a large time before the current through winding 2-3 reaches zero. The power supplied to the circuit is in this way very low and protects in this way the circuit.

9.2.4 Other output voltages:

The output voltages +8S, +9S and +5S are made by winding 5-6. During the time that the fet TS7504 is not conducting, energy is transformed to this winding (flyback principle) and the voltages mentioned above are created. From the +9S, the +5S voltage is derived. This voltage is stabilized by transistors TS7505, TS7500 and zenerdiode D6500. D6500 is the reference voltage and TS7505 is delivering the current. When zenerdiode D6500 starts conducting, the voltage over resistor R3502 becomes high and a POR signal is created.

9.3 Degaussing:

R3516 is a dual PTC (2 PTC's in one housing). After switching "on" the set, the PTC is cold, so low ohmic. This makes the degaussing current high. After degaussing the PTC is heated, so high ohmic. This makes the degaussing current low. After degaussing the PTC remains heated by the mains.

9.4 Line-circuit (Diagram A1):

The primary side of the line-circuit and the deflection coil are connected to the hot earth. The driver-circuit contains an opto-coupler to create isolation between the low-signal parts and the

mains. The optocoupler is driven by pin 37 of IC7100-6E via transistor TS7103. When TS7103 is not conducting,(the LED of the optocoupler is also out of conduction) TS7421 is also not conducting. In this way TS7422 will conduct and the 96V is placed over winding 2-1 of the LOT. A voltage over winding 2-1 of the LOT will cause a voltage over the windings 8-10, 6-10 and 9-10. Now energy will be transformed from the primary to the secondary-side and charge capacitors C2424 and C2425.

C2430 will be charged to the difference of the +40D and +14D (=26V) when TS7422 is conducting. When TS7422 stops conducting, the voltage of pin 8 of the LOT will become very negative. This forces C2430 to be charged to 26V plus the absolute value of pin 8. When TS7422 starts conducting again the voltage of pin 8 of the LOT will increase and so the voltage on the anode of D6422. In this way the 160V is created. This means that during the off-time of TS7422, C2430 is charged and during the on-time of TS7422, the energy in C2430 is given to C2426. When transistor TS7103 conducts, the LED of the opto-coupler will be activated. This causes the transistor of the opto-coupler to conduct, which drives TS7421 in conduction. This brings TS7422 out of conduction. Due to this construction, this circuit is protected against missing line-drive pulses. When a line-drive pulse is missed, the line-transistor stays out of conduction, due to the fact that the diode of the opto-coupler is forced into conduction by TS7103. In this way nothing can be damaged when there is no line-drive.

Winding 4-3 is an extra winding to help TS7422 to switch.

On the secondary-side of the LOT there is a circuit consisting of TS7423, R3422, R3433, R3434, C2431 and C2432. This circuit creates a pulse when TS7422 switches off. This pulse indicates that horizontal flyback takes place. This information is fed to IC7100-6E to blank the picture.

9.5 Stand-by:

The standby signal from the mC is low in case of stand-by. Now TS7103 is brought into conduction by R3100. As mentioned before this will switch off the line-output stage completely.

9.6 Deflection :

9.6.1 Horizontal deflection:

The voltage over capacitor C2422 is the same as the voltage over C2515 (96V). When TS7422 is conducting this voltage is placed over the horizontal deflection coil. This causes a linear increasing current through this coil. In this way deflection is created. When TS7422 switches of flyback takes place and it starts all over again. L5424 is used for linearity correction.

9.6.2 Vertical deflection:

Vertical deflection is based on a balance amplifier. Or TS7401 or TS7402 is conducting. This depends on the signal V-drive. If V-drive is high TS7401 conducts and the voltage of C2401 is placed over the deflection coil. Now the picture is written. When V-drive is low, TS7402 conducts and the +40V supply voltage minus the voltage over C2401 is placed over the deflection coil. Flyback takes now place. In this way deflection is generated.

R3407 is used to adjust the vertical shift. With this resistor the level of the signal VFB is adjusted. R3402 and C2404 are used to damp oscillation of the deflection coil with his parasitic capacitance. The signal NIL from the mC is used to create a non-interlaced mode. This is done by creating a small DC current through the deflection coil.

9.7 110 degrees deflection module

For the 25" and 28" sets a 110 degrees module is needed for East/West correction. This panel is allocated on the right hand side of the mainboard (seen from the rear). East/west correction in this module is based on the diode-modulator principle; the current through the horizontal deflection coil is modulated. As this is done by a parabolic-shaped voltage, E/W distortion is corrected. This parabolic-shaped voltage is derived from a saw-tooth-shaped voltage of the frame deflection.

9.7.1 Frame (time base frame)

Because the raster part is fed by the primary side a galvanic isolator must be applied between IC 7100 (= so called Bimos ic) in the secondary side and the raster amplifier on primary side. This is realised by opto coupler (7422); this opto coupler will be switched and it will block the saw-tooth of the Bimos ic. So we don't use the saw-tooth of the Bimos((pin 42) or the feedback frame input(pin 41). The only information from the Bimos ic (=IC7100) is the flyback command(pin 43). The output of this pin is a pulse of 6 to 0 Volts during 1 mS with a period of 20mS. This signal blocks transistor 7424 and this causes conduction of the opto coupler diode (7422). The internal transistor also conduct and pins 11 and 12 (connector 00820) of the 110 module will be short circuited.

9.7.2 Raster part

A saw-tooth must be created because we don't use it from the Bimos ic(see annex 5). Via 150V C2901 will be charged via R3901, R3900 and D6900; the function of D6901 is to determine the lower part of the potential level. After 20mS a signal coming from the Bimos ic will short-circuit pins 11 and 12 of connector 0082 and C2901 will be discharged. It is a must to have an amplitude on the screen independent of the 50Hz or 60Hz frequency of the mains; see circuit diagram annex 6. The emitter voltage of T7900 can be adjusted with potentiometer 3903; this is the top Voltage of the saw-tooth. This is the circuit for adjusting the vertical amplitude independent of the 50/60Hz frequency. The saw-tooth will control T7901 and this transistor controls the amplifier (= T7902, T7903 and T7904).D6902, D6903, T7905 and C2904 determines the flyback. This flyback pulse is negative and is created by an inverted polarity of C2904.During the deflection T7905 is blocked and C2904 charges; during the flyback T7905 conducts and the flyback pulse will be made.

9.7.3 East-West modulator

The parabola is taken on C2907; R3916 and D6905 determines the shape of the parabola and they corrects the upper and lower parts. The parabola is fed via C2908 to potentiometer 3913; this for adjusting the pin-cushion correction. Via T7904 this signal goes to MosFet 7908; the Vgs command has two functions by changing the Voltage of Vgs by potentiometer 3924: pin-cushion correction and horizontal amplitude adjustment.

Special components:

- D6904 + R3916: temperature compensation of Vbe (T7904)
- R3935: trapezium correction
- C2909: to avoid external radiation
- C2918: to avoid "twisted or broken" lines

3.7.4 Line timebase

The control voltage of pin 37 of the Bimos ic (=ic7100) is derived via opto coupler pos 7420 to transistor T7421; then send via C2428 and C2421 to pins 5 and6 of connector 0082; this is the control of the base of T7906 (=BU1508AX). At the flyback diode between collector and mass there are two parts present to allow the East/west modulation. One part of this modulator consists of D6906, T7908, C2910 and C2911. The second part another diode is not visible in the circuit diagram but it is present in the MosFet 7908.

On pins 1 and 2 of the module the primary side of the LOT is connected. The LOT supplies the following voltages:

- 3-5 : 26 Volts after smoothing
- 10-8: 14 Volts
- 9 : 160 volts for video amplifiers.

3.8 BIMOS IC: PAL I Version

3.8.1 Introduction

The TDA 8361 is a single chip video and audio processor and it incorporates a built in IF-detector, Luminance and Chrominance separator, PAL/NTSC Chroma Decoder, RGB processing, Horizontal and Vertical Oscillators, Sync Separators and the FM Sound demodulation circuit.

3.8.2 Bimos Start Up

The Bimos device (Line Oscillator) starts up via pin 36, however it will only start up when the voltage on this pin has reached 5.6 Volts. At 5.6 Volts the output frequency will be about 25kHz. The supply voltage at this pin (Pin 36) is produced by the Switched Mode Power Supply and not by the Line Out Put Stage. Once the supply voltage on Pin 10 has (Line Output Stage) reached the 8-volt threshold the output frequency will switch to 15.625 kHz. The voltage on this pin is prevented from exeading 8 volts by zener diode 6106 (Page 10)

3.8.3 Horizontal Sync Separator

This functional block separates the horizontal sync pulses from the CVBS and then locks the pulses to the free running horizontal sawtooh generator. However both the vertical and horizontal oscillators are also internally locked to the 4.43 MHz Chroma reference Crystal item 1100.

- The Horizontal Oscillator Saw Tooth Generator The sawtooth is converted to a square waveform with a variable duty cycle. This square waveform is then fed to the Line O/P stage via a Galvanic Isolator. The correct line time constant is automatically determined, internally by the BIMOS IC.
- Pin 38 This is pin has two purposes, these are.
  1. The Sandcastle Pulse O/P
  2. Horizontal Flyback Pulse Input

  1. The Sandcastle Pulse has an output current of a few micro amps; the amplitudes of the sandcastle pulse components are: Burst 5V3; Line Blanking 3V and Frame Blanking 2V.
  2. The HOR FLYBACK input has a current of 100-300 uA. The Horizontal flyback pulse input, allows the phase of the flyback pulse to be compared internally with the phase of the horizontal oscillator; if the phase is not correct, the horizontal oscillators duty cycle will be adjusted accordingly.

9.9 Vertical Synchronisation and Frame Amplifier

9.9.1 The Vertical Sync Separator

This functional block separates the Frame Synchronisation pulses from the CVBS signal, once these pulses have been separated the pulses are then used to synchronise the Frame Oscillator.

9.9.2 Amplitude

The voltage on pin 42 of the BIMOS device determines the amplitude of the frame sawtooth.

9.9.3 Frame Pre Amplifier

This internal amplifier increases the amplitude of the Frame sawtooth, from here the frame sawtooth is available at pin 43.

9.9.4 BCI Input Pin

This Input is fed into the BIMOS device form the Tube Base Board, It is used to provide frame correction for changes in the EHT voltage. For example if the EHT decreases (more white) the picture will get larger. This results in the BCI decreasing and the picture size being automatically corrected by the BIMOS.

9.9.5 The IF Demodulator

The IF bandpass characteristic is determined by SAW filter 1001. The IF signal is then fed from here into BIMOS pins 45 and 46. Pin 1 of the IC is used for the selection of positive or negative video modulation. It is high for positive modulation and low for negative.

9.9.6 AGC

Pin 47 is used for AGC (AGC is used to adjust the gain of the Tuner so that over modulation is avoided).

9.9.7 AGC Threshold Adjustment

Variable resistor R3130 which is connected to pin 49 adjusts the AGC Threshold

9.9.8 Automatic Frequency Control/ Pin 44

The AFC control signal is available at pin 44 of the BIMOS device. It is obtained from the internal IF reference signal. C2100 is used to smooth the AFC voltage.

9.9.9 IDENT Signal/ Pin 4

The IDENT signal on pin 4 is "High" when horizontal sync is detected in the video signal and low when no sync is detected. The IDENT line is connected to the main Microprocessor. (Pin15)

9.9.10 What does the IDENT line do ?

It is used for tuning control (for switching from fast to the slow tuning mode) Pin 4 (BIMOS) is also used by the microprocessor (Pin15) for "No Signal Standby" after 15 minutes. Used to provide a stable OSD - Time constant switched by the BIMOS.

9.9.11 IF Source Select, Luminance And Chrominance Separation.

The Baseband Video signal (normal amplitude 2Vpp) at Pin 7 also contains the inercarrier sound signal, however the sound signal has to be filtered out before the Video signal can be used . Ceramic filter 1102 (6 MHz) is used for this purpose. After the filter has removed the sound, the Video signal is then fed back into the IC at Pin13. From here the signal is internally fed to a source selector switch, Pin16 is used for source select control. If Pin 16= 0V This is Internal Video Input Mode If Pin 16= 8V External Video Input Mode Is Selected BIMOS Pin 16 is controlled via the STATUS and the External 2 switching signals, which originate from the main microprocessor.

9.9.12 Luminance And Chrominance Separation

The Chrominance signal is filtered out by using a Notch Filter, the Notch Filter provides -20db of attenuation. The Notch Filter is accurately internally calibrated by the subcarrier frequency (4.43 MHz).

9.9.13 Sharpness Control-Pin 14

Picture Sharpness is adjusted at Pin 14 of the BIMOS IC. The voltage variation expected here will be between 2.5V-5V. Picture Sharpness is adjusted in the on screen Picture Menu.

9.9.14 Crominance Decoder

The Chrominance signal originating from the CVBS signal (Pin 7) is filtered and then applied back into the BIMOS via either pins13or15.Pin16
is connected to the Microprocessor (Pin17) and is used for internal/external video switching. The internal Chroma Decoder is then internally fed with this selected feed, see page 11. From here the Chroma is fed to a pre amplifier and then on to the Burst Demodulator, the next stage is the R-Y and B-Y Demodulator. The Line and Frame Oscillators also use the 4.43 MHz reference signal available at pin 35.

9.9.15 Pin 27

Is used for Chroma standards selection, however as these sets are PAL only this pin is permanently forced in the PAL system via this pin. To facilitate this 5.5 Volts is applied to this pin via R3104 and R3145, 4K7.

9.9.16 Pin 32

This pin is used in combination with a separate SECAM decoder, it is used to select either the PAL or SECAM colour systems.

For PAL only sets, this pin will be set at 1V5 volts.

9.10 Video Controller Section: RGB-Dematrixing

This block dematrixes the -(R-Y), -(B-Y) and the Y signals into RGB signals; the Sandcastle pulse, which is derived internally, synchronises the internal RGB dematrixing process, it is also used to suppresses the RGB output signals during Frame Flyback.

9.10.1 Analogue Control

- 0-4V5 /Contrast Pin 25
- 0-5V /Brightness Pin 17
- 0-2V5 /Saturation Pin 26

9.10.2 Fast Blanking

Via the FAST BLANKING signal available at pin 21 RGB input selection is also made.

9.10.3 OSD FAST BL

Originates from the OSD generator; this signal is "high" (>1V) to insert OSD characters.

9.10.4 F.BL.SCART

This is the fast blanking signal form pin 16 of Scart 1. This signal is "high" (>1V) to switch the RGB source select into external input mode.

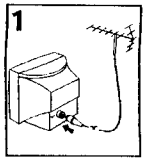
Note: Scart 2 does not have RGB capability.

9.10.5 F.BL. TXT

Fast Blanking signal from the Teletext Decoder. This pin is high (>1V) to switch the RGB source select into external mode. Pin 22 Red, 23 Green and 24 Blue.

Setting up your television

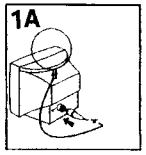
Please read the safety and care information at the back of this booklet before you connect this television to the electricity supply.



Make the connections

The aerial

Connect the aerial lead to the aerial socket at the back of the television (see diagram 1). We have supplied a loop aerial which fits in a hole at the back of the television (see diagram 1A). If reception conditions are good enough you may be able to get high-quality picture and sound by using the loop-aerial. You will need a good-quality aerial to receive Teletext on model 1465TS.



Other equipment

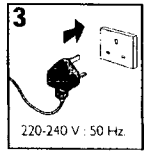
If you have a video recorder, you will need to connect the aerial lead to the video recorder. Then, connect the aerial output lead from the video recorder to the television aerial socket. There is information about connecting aerials and other equipment in 'How to connect scart cables' on page 8-9.

The scart (AV) socket

This television has a special socket called 'scart' (AV). This allows you to connect your television to other equipment. You don't have to use this straight away, but using scart cables gives you the best picture and sound quality and can get rid of picture interference. If you have other equipment with scart sockets, please read 'How to connect scart cables' on page 8-9.

Putting the batteries in the remote control

- Slide your thumbnail under the edge of the battery cover where it says 'open' and press with your thumbnail while lifting the cover up (see diagram 2).
- Put in the two batteries that came with your television (size AAA or LR3)
- Make sure that the (+) and (-) marks on the batteries agree with the (+) and (-) marks inside the battery compartment.
- Replace the cover by sliding it into position and pressing down at the end marked 'open'.
- Throw away old the batteries carefully. Do not put them on a fire.



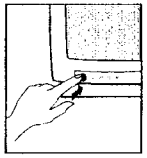
Power supply

Plug your television into the mains supply (220 to 240 volts, 50Hz).

Moving the television

The earth's magnetic field can affect the colour quality of the picture, but your television has a built-in demagnetisation system to prevent this. The system works whenever the mains power is switched on while the television is cool. So if you have to move the television, leave it for at least 15 minutes before you switch it on.

Switching the television on and off



Switching the television on

Switch the television on with the main power button ⏻ on the television. The red light on the television control panel will light up. If the screen does not light up after a few seconds, it probably means the television is in stand-by mode (see below).

Stand-by mode

Stand-by mode allows you to turn the television on and off with the remote control or the built-in timer. When the television is on stand-by, it is nearly all switched off and uses little power. You can switch it back on again by pressing any of the following buttons.

- One of the number buttons 0 to 9 on the remote control.
- The P + or P - button on the remote control.
- The + or - button on the front panel of the television.

The stand-by light will get dimmer and after a few seconds the screen will light up.
Press the red ⏻ button on the remote control to put the television back on stand-by. The red light on the television control panel will get brighter when the television is on stand-by.

Switching the television off

The television remembers if it is on stand-by. If the main power switch is switched off when the television is on stand-by, when you switch the television back on with the main power switch, the television will stay on stand-by. Please see 'Stand-by mode' above for how to switch the television on.

Automatic power-saving feature

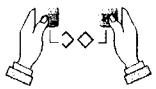
If no signal is received through the aerial cable after about five minutes, the television will automatically turn to stand-by mode (see 'Stand-by mode' above).

Tuning in the programmes

Before you start

1 If you have a video recorder connected with the aerial lead, switch it on to produce a test picture, or play a video tape.
2 If you have a satellite receiver (or any other equipment as well as the video recorder) connected with the aerial lead, make sure that mains power is supplied to it, and that it is on stand-by.
3 Switch your television on. If the screen does not light up, please see 'Switching the television on' on page 2.

We recommend that you follow the instructions below, but there is another way of tuning in the programmes which automatically stores all the signals your television can receive. Afterwards you can store the channels on the appropriate programme numbers. For example, BBC 1 on programme one, BBC 2 on programme two and so on. To do it this way, please read 'Auto store tuning' on page 10.

Which buttons to press on the remote control	What the screen will show	
1 	When ◇ and ◇ are pressed together, the installation menu will appear on the screen. The symbols are just underneath the buttons.	
2	Press the menu + button and 'manual store' will appear on the screen.	
3	Press the menu + button again and 'searching' will appear. A bar on the screen will move to show the progress of tuning. When the television finds a signal, 'searching' will go off the screen, and the programme number will flash. If the picture quality is poor, there may be a better signal on another frequency, so start searching again by pressing the menu + button again. The best signals are usually in a group, one after the other.	
4	When your television has found a good signal, decide which programme number you want it on, for example programme 1 for BBC1. Make sure you can recognise the test picture from any other pieces of equipment if you have them connected. While the programme number is flashing, press the P+ or P- button to change the number. You can't use zero.	
5	When you press ◇ and ◇ together again, 'stored' will appear on the screen and the television will store the television channel on the programme number you have chosen.	
6	Repeat steps 3 to 6 to store each programme.	
7	Press the menu button twice to leave the manual store display.	

Tips for tuning

Changing the programme number of a television channel

1 Press the ◇ and ◇ buttons together to get the installation menu on the screen.
2 Press the menu + button to get the manual store menu on the screen.
3 Select the channel you want to change by pressing the P+, P- or the 0 to 9 buttons.
4 Press the ◇ and ◇ buttons together again to make the programme number flash.
5 Press P+, P- or the 0 to 9 buttons to enter the programme number you want to give to that channel. You can't use 0 because it is reserved for the scart (AV) channel.
6 Press the ◇ and ◇buttons together once more to make 'stored' appear. The television has now stored the television channel on the programme number you have chosen.
7 Repeat steps 3 to 6 if you want to change the programme numbers of other channels.
8 Press the menu button twice to get back to normal viewing. (You can turn off any of the on-screen displays by pressing the menu button several times.)

Picture interference from other equipment

If you have used the aerial lead to connect a video recorder, satellite receiver or other piece of equipment, switch the equipment on one piece at a time and check the picture on all your programmes. The pieces of equipment that are not switched on must be on stand-by. If any of your programmes have wavy lines on the picture when the equipment is switched on, you will have to change the output frequency of the equipment. Please read the instruction book for the equipment to find out how to do this. Change the output frequency a little at a time (or in 8MHz steps) and keep checking all your programmes.
When there are no wavy lines (or other interference) on any of the pictures, re-tune the programme number that you have chosen for your equipment (see 'Tuning in the programmes', on pages 2 to 3).
Do the same for each piece of equipment, but after you've finished with each one, leave it switched on while you check the next piece of equipment.
Continue until you have all the pieces of equipment working together without interfering with each other.
If you cannot get rid of the interference, you may have to connect the equipment with a scart cable, (see 'How to connect scart cables' on page 8-9).

Changing channels without leaving the installation mode

As long as the programme number is not flashing, you can change channels while the installation menu is still on the screen.

Features on the television

Main power switch ⏻ — Please read 'Switching the television on and off' on page 2.

Menu adjustments — MENU [-] [+]

Keep pressing the menu button to display the symbols for the items you can adjust: ◿ (volume), ☼ (brightness), ◑ (contrast), ◫ (sharpness), ❁ (colour) and ⏲ (the timer). If you don't make any adjustments, the menu display will automatically disappear after 10 seconds.
When there is no symbol shown on the screen, the - button selects the previous programme number and the + button selects the next programme number.
Volume is for making the sound louder or quieter. Brightness, contrast, colour and sharpness are picture adjustments. Your television displays a bar to show the adjustment. Press + to increase the item you are adjusting, and the bar will get longer. Press – to reduce the item you are adjusting, and the bar will get shorter.

The timer

When the timer symbol is displayed during menu adjustments, you can set the television to automatically go on stand-by after a certain length of time. The time is displayed like a 24-hour digital clock (for example, 7pm is shown as 19:00). Each press of the menu + button increases the time in 10 minute steps up to 24 hours, then it goes back to zero again. You can reduce the time by pressing the menu - button. When 00:00 is displayed, the timer is off.

If you need to check how much time is left before the television will go on stand-by, press the ⊡ (screen information) button on the remote control. During the last minute before the television switches off, a seconds count-down will be displayed. Press the ⊡ button again to make the time display go off the screen.

Aerial socket

You connect your aerial to this socket; see 'Setting up your television' on page 1.

Scart socket

If you want to connect other equipment which has scart sockets, please read 'How to connect scart cables' on page 8-9.

Using the remote control

When you press one of the buttons on the remote control, point the remote control at the television control panel. Stay within 7 metres of the control panel and keep more-or-less straight in front of it.

The button	The result
Standby	The television goes on stand-by (see 'Stand-by mode' on page 2).
Programme selection	The number is displayed on the picture for a short time. P- selects the previous programme number and P+ selects the next programme number. If the television is on stand-by, pressing P+ or P- will turn it back on.
Numbered keys	The number is displayed on the picture for a short time and the programme changes. For a 2-digit number, you must press the second number before the dash after the displayed number disappears.
Volume	+ turns the sound up. - turns the sound down. * If the sound won't get loud enough, hotel mode might be working. Please read 'Hotel mode' on page 11.
Mute	If you press the button once, the sound will go off and 🔇 will appear on the screen. If you press the button again, the sound will come back on and 🔇 will disappear.

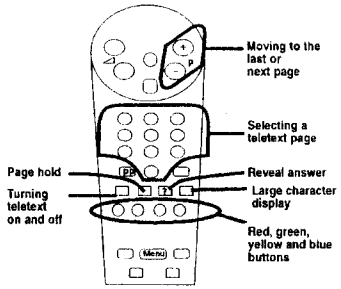
The button	The result
Menu	Keep pressing the menu button to display the symbols for the items that you can adjust: ◿ (volume), ◺◿ (balance), tone 𝄞 (treble) or 𝄢 (bass), ☼ (brightness), ◑ (contrast), ◫ (sharpness), ❁ (colour) and ⏲ (the timer).
Menu adjustment	You can adjust any of the items in just the same way as when you use the menu and menu adjustment buttons on the television (please see 'Features of the television' on pages 4 to 5). The + and - buttons do not change the programme number.
Storing adjustments	Keep pressing the menu button until the symbol of the item you want to adjust is displayed (except the timer). Before the symbol goes off, press the two buttons marked ◇ and ◇ together (the symbols are just underneath the buttons). 'Stored' will appear on the screen, and the television will store all the menu adjustments you have made (except the timer) as your personal preference (PP).
Personal preferences	Press this button to recall your stored picture and sound adjustments.
Screen information	Press this button to display the programme number on the right of the screen. If the timer is on, the amount of time that is left before the television will go on stand-by will also be displayed. Press this button again to turn the display off. The type of sound is also displayed (see below), but it only stays on the screen for about 5 seconds.
Sound mode	**This button lets you choose the type of sound.** Which type of sound you can choose depends on the type of sound in the television broadcast you are watching. Press the I/II button to switch between the different types of sound. These are shown below with their on-screen display symbol. The sound will normally go back to stereo when you change channels. **On-screen display symbol** — **Meaning** None — FM mono sound MONO — Nicam mono sound I or II — Nicam dual language broadcast STEREO — Nicam stereo sound If the signal strength is very poor, your television may automatically go to FM mono sound. If I or II is displayed, it means you are listening to the first or second sound channel of a broadcast in which each channel carries different sound, such as different languages.

Nicam sound

Nicam is an acronym for a way of broadcasting high-quality sound signals along with the television picture and lower-quality monophonic FM sound. Different types of sound can be carried by NICAM, such as stereo, different languages or high-quality mono.

Teletext

The teletext service is an on-screen magazine that is carried on a television broadcast signal. Teletext information can also be carried by a signal fed into the scart or AV input of the television.


Moving to the last or next page
Selecting a teletext page
Page hold
Reveal answer
Turning teletext on and off
Large character display
Red, green, yellow and blue buttons

Turning teletext on and off

1 Turn on your television and choose a programme.
2 Press the (teletext) button to switch the television to teletext mode. As long as the programme you have chosen has teletext, the main index page will soon be displayed. If there is no teletext programme, P100 will appear but the screen will stay black. In this case, turn teletext off by pressing the button and try another programme.
3 To turn teletext off, press the button again.

Choosing a teletext page

1 Use the number buttons on the remote control to enter the page number you want to see. You must enter the page number as a complete three-figure number. The page number you have chosen is displayed on the top left-hand side of the screen. As soon as you enter the third number, the page number in the middle of the top line of the display will start to change, this shows that the television is looking for the new page. When the television finds the new page, the number in the centre will stop changing.
2 To choose a new page, simply use the number buttons on the remote control to enter a new page number.
3 If you enter the wrong number, press more numbers until you have entered three numbers, then enter the correct page number.
4 To return to normal television viewing press the button again.

Moving to the last or next page

To go to the page above the one you are on, press the P+ button. To go to the page below the one you are on, press the P- button. This television has a page memory which stores a few pages above the one you are reading. When you press the P+ button the next page will appear almost instantly, as long as the television has had time to store it since you last changed page.

Newsflash and subtitle pages

These special pages are displayed as a small box of text on the television picture. The page numbers are given by the service provider (for example, on BBC1 Ceefax, page 888 gives you subtitles).

Fast text pages (the red, green, yellow and blue buttons)

The four coloured page headings at the bottom of the screen are associated with the displayed page. To see the page corresponding to one of these headings, press the matching coloured button. Each time you change the page, while you are reading the page you just selected your television is loading a new set of associated pages. Once it has done this, you can display any of these pages almost instantly by pressing one of the coloured buttons.

Sub-pages

Some teletext pages contain too much information to fit on the screen at once, so they are split up into sub-pages and shown in order. The service provider usually displays a label in the top right-hand corner of the screen to show which sub-page is being shown. For example '3/6' shows that you are looking at the third of six pages.

Page hold

When information on one teletext page will not fit on the screen, sub-pages are shown in order (see 'Sub-pages above'). To keep a sub-page on the screen for longer than usual, press the button.
To cancel page hold mode, press again.

Large character display

Keep pressing the button to change the character size. Press the button once to display the top half of the page at twice its normal height. Press the button again to display the bottom half of the page at twice its normal height. Press the button again to return the text to its normal size.

Reveal answer

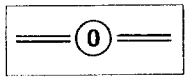
Use this button on certain pages to reveal the solutions to quizzes and so on. Press the button once to reveal a hidden answer and press it again to hide it.

The scart sockets

The scart sockets at the back of the television are a convenient way of connecting audio and video (AV) signals to and from the television. As the signals are in a more basic form than the signal at the aerial socket, they are less likely to be affected by interference and other things that can reduce picture quality.

To select the scart channel

Press the 0 button on the remote control. 'EXT 1' will be displayed for a few seconds and you will see the picture from any equipment that is connected to the number 1 scart socket (if that equipment is switched on). If there is no signal at the scart socket, the screen will remain dark. Press the 0 button again and 'EXT 2' will be displayed to tell you that you have selected the number 2 scart socket.



The table below describes the facilities supported by the scart sockets on your television.

AV features	Connector type	AV in	AV out	AV switch (pin 8)	Where the AV output comes from	RGB	RGB blanking (pin 16)
EXT 1	Scart	Yes	Yes	Yes	Tuner	Yes	Yes
EXT 2	Scart	Yes	Yes	Yes	Screen	No	No

Video

Most equipment produces a 'composite video, blanking and synchronisation' signal (CVBS), usually just called 'video'.

RGB

The sharpest and clearest possible picture is reproduced from separate red, green and blue signals (RGB). Only certain computers and high-quality digital equipment produce this form of signal. Only the EXT 1 scart socket is wired for RGB input.

Automatic AV mode or video switching

Some equipment provides an automatic switching signal, so that the video recorder (and so on) 'tells' the television to reproduce its video and audio signals. For example, if you play a video tape, you will not have to press the '0' button on your remote control, as the television will automatically switch to the video channel.

Automatic switching priority

EXT 1 has priority over EXT 2. If a piece of equipment tells EXT 2 to come on at the same time as a piece of equipment tells EXT 1 to come on, the television will always go to EXT 1. You can change between EXT 1 and EXT 2 by pressing the zero button on the remote control.

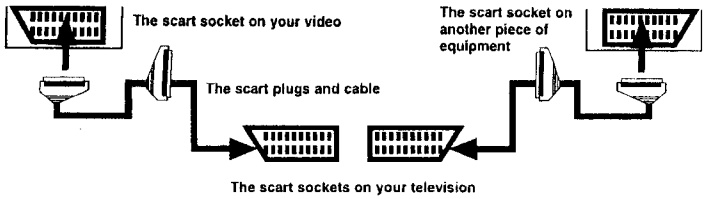
Equipment that can be connected to the television

You can usually connect video recorders, camcorders, satellite receivers, PAL video disc players, audio amplifiers and video games to this television, but we cannot guarantee that all combinations of equipment will work. You can buy many different cables to connect these things.

Recording from the television

You can connect a video recorder to scart socket EXT 2 and record from the television. Whatever you see on the screen is what you will record through the scart socket of the video recorder, unless you are displaying RGB (please see above for a description of RGB).

How to connect scart cables


The scart socket on your video
The scart socket on another piece of equipment
The scart plugs and cable
The scart sockets on your television

How to connect a video recorder only
Connect the video recorder scart socket to the EXT 1 scart socket on your television. If your video recorder has two scart sockets, use the one marked TV. The television aerial should go to the video recorder, then to the television.

How to connect a satellite receiver only
Connect the satellite receiver scart socket to the EXT 1 scart socket on your television. If your satellite receiver has more than one scart socket, use the one marked TV. Your television aerial should go to the satellite receiver, then to your television.

How to connect a satellite receiver with one scart socket and a video recorder with one scart socket
If your video recorder has only one scart socket, connect it to the EXT 1 scart socket on your television. Your television aerial should go to the satellite receiver, then to the video recorder, then to your television. So that you can record satellite broadcasts, you will have to tune one programme number on your video recorder to the satellite receiver (please see your video and satellite instruction books for details of how to do this). So that you can watch satellite television while you are recording normal television, you should also tune one programme on your television to the satellite receiver (please see 'Tuning in the programmes' on pages 2 to 3 for details).

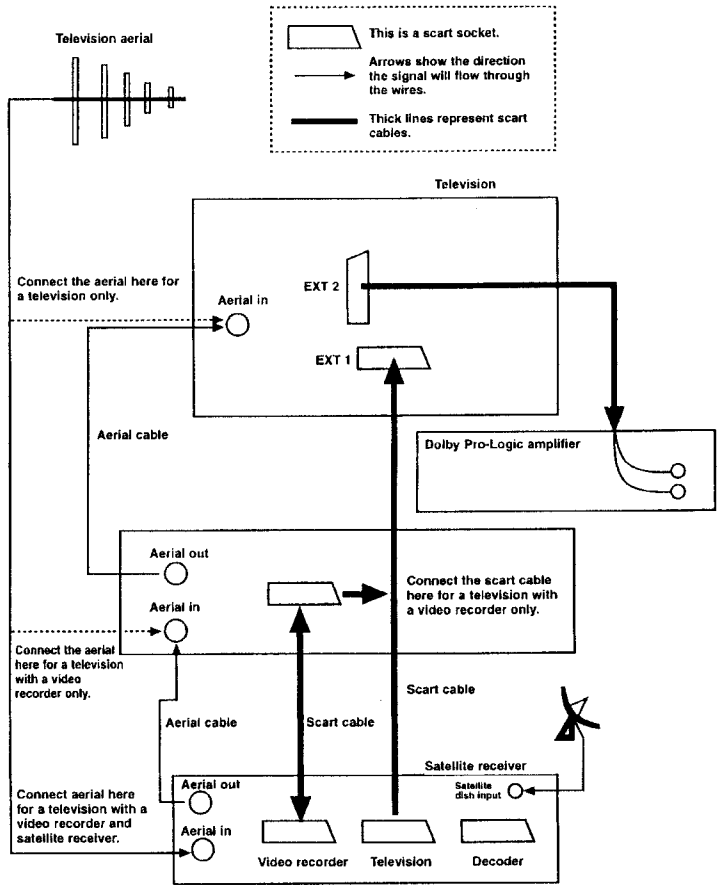
How to connect a satellite receiver with one scart socket and a video recorder with two scart sockets
If your video recorder has two scart sockets, connect one (which may be marked TV) to the EXT 1 scart socket on your television and connect the other to your satellite receiver. Your television aerial should go to the satellite receiver, then to the video recorder, then to your television. You may need to read your video recorder instructions to find out which is the best scart socket to connect to your television and how to record from the scart socket you have connected to your satellite receiver. So that you can watch satellite television while you are recording normal television, you should also tune one programme on your television to the satellite receiver (please see 'Tuning in the programmes' on pages 2 to 3).

How to connect a satellite receiver with three scart sockets and a video recorder with one or two scart sockets
If your video recorder has two scart sockets, only use one of them. Connect your video recorder to the scart socket marked VCR on the satellite receiver. You may need to read your video recorder instructions to find out which is the best scart socket to use and how to record from the scart socket you have connected to your satellite receiver. Connect the scart socket marked TV on the satellite receiver to the EXT 1 scart socket on your television. Your television aerial should go to the satellite receiver, then to the video recorder, then to your television.

- For all of these connections you must put the satellite receiver on stand-by to send the audio and video signals from the video recorder to your television. If you want to watch satellite while you are recording normal television, select a channel on the satellite receiver and press the 0 button on your television remote control.
- If you decide to watch normal television while you are recording satellite, you may find you automatically get satellite pictures and sound from your television. If this happens, use your remote control to select the programme number you want to watch.

What is the second scart socket for?
There are other possible combinations besides the ones we have given you. You might want to change the connections and use of the extra socket. You may also find it useful for feeding sound signals to a surround sound amplifier.

Typical connections for a satellite receiver with three scart sockets and a video recorder and a surround sound amplifier.


Television aerial
This is a scart socket.
Arrows show the direction the signal will flow through the wires.
Thick lines represent scart cables.
Television
Connect the aerial here for a television only.
Aerial in
EXT 2
EXT 1
Aerial cable
Dolby Pro-Logic amplifier
Aerial out
Aerial in
Connect the scart cable here for a television with a video recorder only.
Connect the aerial here for a television with a video recorder only.
Scart cable
Aerial cable
Scart cable
Satellite receiver
Aerial out
Satellite dish input
Connect aerial here for a television with a video recorder and satellite receiver.
Aerial in
Video recorder
Television
Decoder

11 List of Abbreviations

+96S	Supply voltage from the SMPS to the line output stage.This voltage is 104V for 21" sets.
+160V	Supply voltage from the LOT for the CRT-panel.
+40D	Supply voltage from the LOT for vertical deflection.
+8V	Supply voltage for AM-sound.
+8Vx	+8V Supply voltage from the SMPS for the whole small signal part. x can be (a,b,c,d).
+5Sx	+5V supply voltage from the SMPS to the µC and periphery. x can be (a,b,c,d).
mC	Microcomputer.
AFC	Automatic Frequency Control.
AGC	Automatic Gain Control.
AQUA	Aquadag on the rear side of the picture tube to pin 8 of the LOT.
ATS	Automatic Table Setting (auto install system for Germany only).
AUDIO-OUT	Outgoing audio signal from pin 15 IC7140 to pin 1 and 3 from scart.
B-SC-IN	Blue input signal from the scart to the video controller IC7015-6D.
BASEBAND	CVBSBaseband CVBS signal from the IF-detector IC7015-6B to the FM-demodulator IC7015-6F.
BEAM INFO	Beam Current Info; If beam current increases the BCI signal decreases. BCI is used for contrast reduction (if beam current is too high) and picture correction (if beam current increases (more white), EHT decreases so picture will become too big, BCI decreases and the picture will be corrected).
BRIGHTNESS	Control signal (from µC, but on DC level via RC network) for brightness control of the video controller IC7015-6D (0-5V).
BS1	Switching signal from the µC to select tuner-band.
BS2	Switching signal from the µC to select tuner-band.
C	Chrominance part of the video signal; this signal is also directly input at the SVHS plug.
CCT	Computer Controlled Teletext.
CONTRAST	Control signal (from µC, but on DC level via RC network) for contrast control of the video controller IC7015-6D (0-4V5).
CVBS	Colour Video Blanking Synchronisation (present behind soundtrap 1102).
CVBS-SC-IN	Incoming CVBS signal from pin 20 of scart to the external input pin 15 IC7015-6B.
EEPROM	Electrical Erasable Programmable Read Only Memory.
ESD	Electrical Static Discharge.
FBL	Fast blanking signal made by adding the fast blanking signals of the µC and the SCART fast blanking signals.
FBL-SCART	Fast blanking input signal from scart which is added to the other fast blanking signals to control the video controller IC7015-6D.
FBL-µP	Fast blanking signal from the µP which is added to the other fast blanking signals to control the video controller IC7015-6D.
ff	Filament (heater voltage) from LOT to the picture tube.
FLOF	Full Level One Feature.
FM	FM demodulated sound from the FM-demodulator IC7015-6F.
G-SC-IN	Green input signal from the scart to the video controller IC7015-6D.
H.DRIVE	Horizontal drive signal from IC7015-6E to line output stage.
HFB	Horizontal flyback pulse (15625 Hz) used for locking the horizontal oscillator in IC7015-6E.
I2C	Digital control bus of the microcomputer.
IDENT	Status signal from IC7015-6B; "low" for no CVBS signal (horizontal sync not present), "high" in case CVBS signal is present (horizontal sync present) from the IF-detector IC7015-6B to the µC.
IF	Intermediate frequency signal from the tuner to the AM-demodulator IC7125.
LF-input	Low frequency sound-signal. Input signal for sound amplifier.
L/BG	Switching signal from µC; "low" for LL reception (positive modulation, AM sound), "high" for BGIDK reception (negative modulation, FM sound). The µC makes BG/L "high" in case EUROPE or UK is selected, and "low" in case FRANCE is selected.
L/L' or BGDK	In case of a LL' set, selection is made between L and L'. In case of a BGDK set, selection is made between BG and DK. If this pin is "high" then L' or DK is selected.
NIL	Non Inter Lace; 25 Hz block-shaped signal from the_µC to the frame amplifier for coinciding the odd & even frames.
OSD-B	Blue info from OSD generator in µC to the video controller IC7015-6D for inserting blue info on the screen.
OSD-G	Green info from OSD generator in µC to the video controller IC7015-6D for inserting green info on the screen.
OSD-R	Red info from OSD generator in µC to the video controller IC7015-6D for inserting red info on the screen.
POR	Power On Reset; ensures the µC starts up its software only if the power supply of the µC itself is high enough.
PP	Personal Preference.
R-SC-IN	Red input signal from the scart to the video controller IC7015-6D.
RAM	Random Access Memory.
ROM	Read Only Memory.
SANDCASTLE	Sandcastle signal from IC7015-6F to delay line IC7271 and SECAM chroma decoder IC7250.
SANDCASTLE1	Sandcastle signal from IC7015-6F to µC.
SATURATION	Control signal (from µC, but on DC level via RC network) for saturation control of the video controller IC7015-6D (0-2V5).
SAW	Surface Acoustic Wave; high precision bandpass filter.
SCL	Clock line of the I2C-bus.
SDA	Data line of the I2C-bus.
SDAM	Service Default-Alignment Mode; predefined mode for faultfinding (see chapter 8).
SHARPNESS	Control signal on DC level (0-5 V) from µC to IF-detector IC7015-6B) for sharpness control.
SM	Service Menu.
SMPS	Switched Mode Power Supply.
SND-SC-l	Incomming audio signal from pin 6 from the scart. This signal is the left audio-channel.
SND-SC-r	Incoming audio signal from pin 2 and pin 6 from scart. In case of a stereo set this is the scart-input for the right sound channel.
SND-SC-L	Outgoing audio signal from pin 3 to the scart. This signal is the left audio-channel.
SND-SC-R	Outgoing audio signal from pin 1 and pin 3 to scart. In case of a stereo set this is the scart-output for the right sound channel.
STANDBY/AFC	Switching signal from µC; "low" for standby (power supply will be switched to stand-by mode), "high" for normal operation. This pin acts also as an input for AFC.
STATUS	Switching signal; "low" for internal CVBS, "high" for external CVBS.
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11 List of Abbreviations

nP INT/EXT	Switching signal from the µC for internal or external audio + video switching ("low" for external and "high" for internal).
/DRIVE	Vertical drive signal from IC7015-6E to frame amplifier.
/-vari	Tuning voltage from µC to the tuner (0-30V DC).
/FB	50 Hz vertical flyback pulse used for locking the vertical oscillator in IC7015-6E.
/FL	Signal to inform the µC that vertical flyback takes place.
/g2	Voltage on grid 2 of the picture tube.
/IP	Video Input Processor.
/OLUME-L	Control signal (from µC, but on DC level via RC network) for volume control in mono BG-sets.
/OL-LEVEL	Control signal (from µC, but on DC level via RC network) for volume control in mono multi-france sets.
/ST	World System Teletext.
/	Luminance part of the video signal; this signal is also directly input at the SVHS plug.

Chassis (incl CRT-panels)

Various

Δ	4822 265 10438	CONNECTOR 2P MALE
Δ	4822 265 30389	2P MALE
	4822 267 50621	7P MALE WHITE
	4822 265 10703	CONN. EURO 21P
Δ	4822 265 11253	FUSE HOLDER 2P
	4822 492 70871	SPRING GR2
Δ	4822 502 13712	TORX SCREW 12X3
Δ	4822 255 70261	CRT SOCKET FL1
1000Δ	4822 210 10464	U943C/IEC
1001	4822 242 81436	OFWK3953M
1100	4822 242 10692	CER (4,433619MHz)
1102	4822 242 81572	TPS6.0MB-TF21
1501Δ	4822 070 32502	21802.5(2.5A)
1502Δ	4822 252 51185	fuse (0,630A)
1503Δ	4822 252 51175	fuse (2.500A)

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2000Δ	4822 124 40196	220µF 20% 16V
2001	4822 124 41643	100µF 20% 16V DIM:6.3X11MM
2005	4822 121 42408	220nF 5% 63V
2100Δ	5322 126 10223	4.7nF 10% 63V
2101	4822 126 12105	33nF 5% 63V
2102Δ	5322 126 10223	4.7nF 10% 63V
2103	4822 124 40756	1µF 20% 100V
2104	4822 124 11529	16V 47µF 20%
2105Δ	4822 122 33177	10nF 20% 50V
2106	4822 124 80195	470µF 20% 10V
2107Δ	4822 124 41579	10µF 20% 50V
2108	4822 124 40756	1µF 20% 100V
2109	4822 121 51252	470nF 5% 63V
2110Δ	4822 126 10002	100nF 20% 25V
2111Δ	4822 126 10002	100nF 20% 25V
2112	4822 122 33175	2.2nF 20% 50V
2112	4822 122 33806	820pF 10% 63V
2113Δ	4822 122 33177	10nF 20% 50V
2116Δ	4822 126 10002	100nF 20% 25V
2117Δ	5322 126 10223	4.7nF 10% 63V
2118	4822 126 13689	18pF 1% 63V
2119	4822 126 13061	220nF 20% 25V
2120	4822 122 33175	2.2nF 20% 50V
2120	4822 122 33891	3.3nF 10% 63V
2121Δ	4822 122 33177	10nF 20% 50V
2122Δ	4822 122 33177	10nF 20% 50V
2123Δ	4822 126 10002	100nF 20% 25V
2124Δ	4822 126 10002	100nF 20% 25V
2125Δ	4822 122 33177	10nF 20% 50V
2129Δ	5322 122 34123	1nF 10% 50V
2130Δ	4822 126 10002	100nF 20% 25V
2131Δ	4822 122 33177	10nF 20% 50V
2132	4822 126 13061	220nF 20% 25V
2136Δ	4822 126 10002	100nF 20% 25V
2137Δ	4822 126 10002	100nF 20% 25V
2139	4822 122 33797	47nF 20% 50V
2140	4822 122 33797	47nF 20% 50V
2142Δ	4822 126 10002	100nF 20% 25V
2143	4822 122 32139	12pF 2% 63V
2146	4822 124 40763	2.2µF 100 V
2147Δ	4822 122 33177	10nF 20% 50V
2148Δ	5322 126 10223	4.7nF 10% 63V
2161	4822 126 13061	220nF 20% 25V
2300	5322 122 32268	470pF 10% 50V
2310	5322 122 31863	330pF 5% 50V
2320	5322 122 32268	470pF 10% 50V
2329	4822 121 43526	47nF 5% 250V
2330	4822 123 14024	16V 1000µF 20%
2330	4822 124 40201	1000µF 20% 16V
2333Δ	4822 126 12171	3.3nF 20% 1KV
2420	4822 124 80676	4.7µF 20% 160V
2421	4822 121 51319	1µF 10% 63V
2422Δ	5322 122 32654	22nF 10% 63V
2423	4822 124 42336	47µF 20% 160V
2425	4822 124 40214	1000µF 20% 25V
2426	4822 124 80676	4.7µF 20% 160V
2427	5322 121 42489	33nF 5% 250V
2428	4822 121 51319	1µF 10% 63V
2429	5322 121 42661	330nF 5% 63V
2431Δ	5322 126 10223	4.7nF 10% 63V
2432Δ	4822 122 33893	18nF 10% 63V
2500	4822 126 13597	330pF 10% 500V
2501Δ	4822 126 11524	1.5nF 10% 1KV
2502	4822 121 51442	2.2nF 10% 50V
2503	5322 121 42489	33nF 5% 250V
2504Δ	5322 122 34123	1nF 10% 50V
2505Δ	4822 126 14037	2.2nF 20% 250V
2506	4822 121 43343	4.7nF 10% 400V
2507Δ	4822 121 10512	275V 220nF 20%
2508	4822 126 14153	2.2nF 10%B 1KV
2509	4822 126 14153	2.2nF 10%B 1KV
2511	4822 124 81151	22µF 50V
2512	4822 124 40723	2200µF 20% 16V
2513	4822 126 13694	68pF 1% 63V
2514	4822 124 81139	2200µF 20% 16V
2515	4822 124 42336	47µF 20% 160V
2516	4822 124 11995	100µF 20% 400V
2517Δ	5322 122 34123	1nF 10% 50V
2600Δ	4822 124 41579	10µF 20% 50V
2601	4822 126 13061	220nF 20% 25V
2602	4822 126 13061	220nF 20% 25V
2604Δ	4822 126 10002	100nF 20% 25V
2605Δ	4822 126 10002	100nF 20% 25V
2606Δ	4822 126 10002	100nF 20% 25V
2608Δ	4822 126 10002	100nF 20% 25V
2609Δ	4822 126 10002	100nF 20% 25V
2610	4822 124 40769	4.7µF 20% 100V
2611	4822 124 40769	4.7µF 20% 100V
2612	4822 124 40769	4.7µF 20% 100V
2613	4822 124 40769	4.7µF 20% 100V
2615Δ	5322 122 34123	1nF 10% 50V
2617	5322 122 32659	33pF 5% 50V
2618	5322 122 32659	33pF 5% 50V
2619Δ	4822 122 33177	10nF 20% 50V
2621	4822 124 40255	100µF 20% 63V
2624Δ	4822 126 10002	100nF 20% 25V
2625Δ	4822 126 10002	100nF 20% 25V
2626Δ	4822 126 10002	100nF 20% 25V
2801	4822 122 31175	1nF 10% 500V
2802Δ	4822 126 13185	680pF 10% 500V
2803Δ	4822 124 41579	10µF 20% 50V
2808	4822 126 13597	330pF 10% 500V
2813Δ	4822 124 41579	10µF 20% 50V

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3005Δ	4822 051 20472	4k7 5% 0.1W
3006Δ	4822 051 20472	4k7 5% 0.1W
3008	4822 116 52219	330Ω 5% 0.5W
3009	4822 117 12955	2k7 1% 0.1W 0805
3010	4822 117 10833	10k 1% 0.1W
3011Δ	4822 051 20472	4k7 5% 0.1W
3012Δ	4822 052 10569	56Ω 5% 0.33W
3100	4822 051 20104	100k 5% 0.1W
3101	4822 117 10834	47k 1% 0.1W
3102	4822 051 20394	390k 5% 0.1W
3103Δ	4822 051 20153	15k 5% 0.1W
3104	4822 117 10833	10k 1% 0.1W
3105	4822 116 52234	100k 5% 0.5W
3107	4822 051 20104	100k 5% 0.1W
3108	4822 051 20822	8k2 5% 0.1W
3109	4822 116 52182	15Ω 5% 0.5W
3110	4822 116 52213	180Ω 5% 0.5W
3111	4822 051 20561	560Ω 5% 0.1W
3112	4822 051 20822	8k2 5% 0.1W
3114Δ	4822 051 20008	0Ω jumper . (0805)
3115Δ	4822 051 20471	470Ω 5% 0.1W
3116Δ	4822 051 20101	100Ω 5% 0.1W
3117Δ	4822 051 20101	100Ω 5% 0.1W
3118Δ	4822 051 20101	100Ω 5% 0.1W
3119	4822 116 83878	270k 5% 0.5W
3121	4822 051 10102	1k 2% 0.25W
3122	4822 117 10353	150Ω 1% 0.1W
3123Δ	4822 051 20101	100Ω 5% 0.1W
3124	4822 117 11503	220Ω 1% 0.1W
3125	4822 050 11002	1k 1% 0.4W
3127	4822 051 20562	5k6 5% 0.1W 0805
3128	4822 116 52235	1M 5% 0.5W
3128	4822 116 52278	390k 5% 0.5W
3129	4822 100 11141	10k 30%lin 0.1W
3130	4822 101 11191	10k 30%LIN 0.1W
3134	4822 053 10689	68Ω 5% 1W
3135	4822 116 52256	2k2 5% 0.5W
3136	4822 116 52175	100Ω 5% 0.5W
3137	4822 051 10102	1k 2% 0.25W
3138	4822 116 83872	220Ω 5% 0.5W
3143	4822 051 10102	1k 2% 0.25W
3145Δ	4822 051 20472	4k7 5% 0.1W
3146	4822 116 83872	220Ω 5% 0.5W
3147	4822 117 11507	6k8 1% 0.1W
3180	4822 116 52289	5k6 5% 0.5W
3181	4822 117 12955	2k7 1% 0.1W 0805
3182Δ	4822 051 20153	15k 5% 0.1W
3300Δ	4822 053 11123	12k 5% 2W
3301	4822 051 20391	390Ω 5% 0.1W
3302	4822 117 11507	6k8 1% 0.1W
3303	4822 116 52176	10Ω 5% 0.5W
3304	4822 116 52207	1k2 5% 0.5W
3305	4822 116 52293	6k2 5% 0.5W
3305	4822 116 83961	6k8 5%
3306	4822 101 11191	10k 30%LIN 0.1W
3307	4822 117 11896	1k5 20% 0.5W
3308	4822 101 11189	4.7k 30%LIN 0.1W
3309	4822 051 20689	68Ω 5% 0.1W
3310Δ	4822 053 11123	12k 5% 2W
3311	4822 117 11452	430Ω 1% 0.1W
3312	4822 117 11507	6k8 1% 0.1W
3313	4822 116 52176	10Ω 5% 0.5W
3314	4822 116 52207	1k2 5% 0.5W
3315	4822 116 52293	6k2 5% 0.5W
3316	4822 101 11191	10k 30%LIN 0.1W
3317	4822 117 11896	1k5 20% 0.5W
3318	4822 051 10102	1k 2% 0.25W
3319	4822 117 11449	2k2 1% 0.1W
3320Δ	4822 053 11123	12k 5% 2W
3321	4822 051 20391	390Ω 5% 0.1W
3322	4822 051 20562	5k6 5% 0.1W 0805
3323	4822 116 52176	10Ω 5% 0.5W
3324	4822 116 52263	2k7 5% 0.5W
3324	4822 116 52276	3k9 5% 0.5W
3325	4822 050 11002	1k 1% 0.4W
3326	4822 101 11191	10k 30%LIN 0.1W
3327	4822 117 11896	1k5 20% 0.5W
3330	4822 117 11896	1k5 20% 0.5W
3420	4822 116 52238	12k 5% 0.5W
3420	4822 116 83864	10k 5% 0.5W
3421	4822 116 52303	8k2 5% 0.5W
3422	4822 117 12955	2k7 1% 0.1W 0805
3423	4822 051 20561	560Ω 5% 0.1W
3424	4822 116 52176	10Ω 5% 0.5W
3424	4822 116 52195	47Ω 5% 0.5W
3425	4822 053 11129	12Ω 5% 2W
3426	4822 053 12103	10k 5% 3W
3426Δ	4822 053 12153	15k 5% 3W
3427Δ	4822 051 20472	4k7 5% 0.1W
3428Δ	4822 052 11108	1Ω 5% 0.5W
3430	4822 116 52243	1k5 5% 0.5W
3431	4822 116 83883	470Ω 5% 0.5W
3432	4822 051 20105	1M 5% 0.1W
3432	4822 051 20225	2M2 5% 0.1W
3433	4822 117 11149	82k 1% 0.1W
3434	4822 051 20223	22k 5% 0.1W
3436Δ	4822 052 10151	150Ω 5% 0.33W
3437	4822 116 52283	4k7 5% 0.5W
3438	5322 116 53564	3Ω3 5% 0.5W
3439Δ	4822 052 10228	2Ω2 5% 0.33W
3500Δ	4822 051 20471	470Ω 5% 0.1W
3501Δ	4822 051 20101	100Ω 5% 0.1W
3502	4822 116 83864	10k 5% 0.5W
3503	4822 116 83961	6k8 5%
3504	4822 116 52249	1k8 5% 0.5W
3505	4822 116 52175	100Ω 5% 0.5W
3505	4822 116 83868	150Ω 5% 0.5W
3506	4822 117 12094	5% PR01
3507	4822 050 21302	1k3 1% 0.6W
3508	4822 053 10682	6k8 5% 1W
3509	4822 116 83884	47k 5% 0.5W
3510	4822 117 12096	22k 1%
3510	4822 117 12707	33k 1% 1.3W
3511	4822 116 52269	3k3 5% 0.5W
3512	4822 116 52297	68k 5% 0.5W
3513	4822 053 10334	330k 5% 1W
3514Δ	4822 052 10108	1Ω 5% 0.33W
3515Δ	4822 052 10108	1Ω 5% 0.33W
3516Δ	4822 116 40137	PTC 36Ω 365V
3516Δ	4822 117 12027	18Ω-3k 25%
3517	4822 051 10102	1k 2% 0.25W
3518	4822 116 52239	120k 5% 0.5W
3519	4822 051 20681	680Ω 5% 0.1W
3521	4822 117 11504	270Ω 1% 0.1W
3601	4822 116 52283	4k7 5% 0.5W
3602	4822 051 20223	22k 5% 0.1W
3603	4822 051 20104	100k 5% 0.1W
3604	4822 117 10833	10k 1% 0.1W
3605Δ	4822 051 20153	15k 5% 0.1W
3606	4822 051 20339	33Ω 5% 0.1W
3607	4822 051 20224	220k 5% 0.1W
3608	4822 117 10833	10k 1% 0.1W
3609Δ	4822 051 20332	3k3 5% 0.1W
3610	4822 116 83864	10k 5% 0.5W
3611	4822 116 83864	10k 5% 0.5W
3612	4822 116 52304	82k 5% 0.5W
3613	4822 116 83864	10k 5% 0.5W
3614Δ	4822 051 20008	0Ω jumper . (0805)
3616	4822 050 11002	1k 1% 0.4W
3618	4822 117 11449	2k2 1% 0.1W
3619	4822 116 52252	180k 5% 0.5W
3620	4822 051 20394	390k 5% 0.1W
3621	4822 051 20394	390k 5% 0.1W
3622	4822 116 83864	10k 5% 0.5W
3623Δ	4822 051 20472	4k7 5% 0.1W
3626	4822 050 11002	1k 1% 0.4W
3627Δ	4822 051 20472	4k7 5% 0.1W
3628Δ	4822 051 20472	4k7 5% 0.1W
3629Δ	4822 051 20472	4k7 5% 0.1W
3630	4822 116 83883	470Ω 5% 0.5W
3631Δ	4822 051 20471	470Ω 5% 0.1W
3632Δ	4822 051 20471	470Ω 5% 0.1W
3633	4822 051 20273	27k 5% 0.1W
3634	4822 050 11002	1k 1% 0.4W
3635Δ	4822 051 20472	4k7 5% 0.1W
3636	4822 116 83872	220Ω 5% 0.5W
3638	4822 117 11449	2k2 1% 0.1W
3639	4822 117 11449	2k2 1% 0.1W
3640	4822 117 11449	2k2 1% 0.1W
3641	4822 051 20392	3k9 5% 0.1W
3642	4822 116 52244	15k 5% 0.5W
3643	4822 051 20822	8k2 5% 0.1W
3644	4822 116 52283	4k7 5% 0.5W
3645	4822 116 52234	100k 5% 0.5W
3646	4822 051 20394	390k 5% 0.1W
3647	4822 117 10833	10k 1% 0.1W
3647	4822 117 11454	820Ω 1% 0.1W
3649	4822 116 52195	47Ω 5% 0.5W
3650	4822 050 11002	1k 1% 0.4W
3651Δ	4822 051 20332	3k3 5% 0.1W
3652Δ	4822 051 20332	3k3 5% 0.1W
3653Δ	4822 051 20101	100Ω 5% 0.1W
3654Δ	4822 051 20101	100Ω 5% 0.1W
3655	4822 051 20122	1k2 5% 0.1W
3656Δ	4822 051 20472	4k7 5% 0.1W
3657Δ	4822 051 20472	4k7 5% 0.1W
3658Δ	4822 051 20472	4k7 5% 0.1W
3659Δ	4822 051 20472	4k7 5% 0.1W
3660	4822 116 52283	4k7 5% 0.5W
3661Δ	4822 053 10103	10k 5% 1W
3666	4822 050 11001	100Ω 1% 0.4W
3671	4822 117 11449	2k2 1% 0.1W
3672	4822 117 11449	2k2 1% 0.1W
3673	4822 117 11449	2k2 1% 0.1W
3674	4822 117 11449	2k2 1% 0.1W
3675	4822 117 11449	2k2 1% 0.1W
3676	4822 117 10833	10k 1% 0.1W
3681	4822 050 11002	1k 1% 0.4W
3800	4822 050 17509	75Ω 1% 0.4W
3801	4822 116 83883	470Ω 5% 0.5W
3802	4822 050 11203	12k 1% 0.4W
3804	4822 050 11001	100Ω 1% 0.4W
3805	4822 116 52283	4k7 5% 0.5W
3806	4822 116 83872	220Ω 5% 0.5W
3807	4822 116 52219	330Ω 5% 0.5W
3808	4822 116 83961	6k8 5%
3810	4822 116 52219	330Ω 5% 0.5W
3811	4822 050 17509	75Ω 1% 0.4W
3812	4822 050 11002	1k 1% 0.4W
3813	4822 116 52176	10Ω 5% 0.5W
3815	4822 116 52219	330Ω 5% 0.5W
3816	4822 050 17509	75Ω 1% 0.4W
3817	4822 050 17509	75Ω 1% 0.4W
3820	4822 050 17509	75Ω 1% 0.4W
3825	4822 050 13901	390Ω 1% 0.4W
4xxx	4822 051 10008	0Ω 5% 0.25W (1206)
4xxx	4822 051 20008	0Ω 5% 0.25W (0805)

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5100	4822 157 63068	0.28µH
5102	4822 157 61898	2uH 47 PM20 (UAW)T
5103	4822 157 60123	6.8µH
5330	4822 156 21334	6µH
5330	4822 157 11418	47µH 10%
5420	4822 157 50965	FXD 15U PM10 A
5420	4822 157 53139	4.7µH
5421	4822 157 11421	100µH 10% 8X10
5422Δ	4822 140 10623	LOT 25"/28"
5422Δ	4822 140 10635	LOT ELDOR 1392.5001
5423	4822 157 71401	27µH
5500Δ	4822 146 10896	TRANSFORMER ASSY
5500Δ	4822 157 11306	DOWN CONVERTER
5504	4822 157 53348	CHOKE ASSY
5505	4822 157 70826	2.4µH
5600	4822 242 10685	CER (12mH z)
5602	4822 157 63507	0.18µH
5603	4822 157 63507	0.18µH
5604	4822 157 63507	0.18µH

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6100Δ	4822 130 30621	1N4148
6101Δ	4822 130 30621	1N4148
6102Δ	4822 130 30621	1N4148
6103Δ	4822 130 30621	1N4148
6104	4822 130 34233	BZX79-B5V1
6106	4822 130 34167	BZX79-B6V2
6108	4822 130 30861	BZX79-B7V5
6330Δ	4822 130 30621	1N4148
6420	4822 130 42488	BYD33D
6421	4822 130 42488	BYD33D
6422	4822 130 42488	BYD33D
6424	4822 130 42488	BYD33D
6426	4822 130 34145	BZX79-B39
6500	4822 130 34233	BZX79-B5V1
6501Δ	4822 130 34173	BZX79-B5V6
6502	4822 130 34281	BZX79-B15
6503	4822 130 32245	BYV10-40
6504	4822 130 41487	BYV95C
6506	4822 130 70021	S1NB60
6507	5322 130 31938	BYV27-200
6510Δ	4822 130 34197	BZX79-B12
6514	5322 130 31932	BZT03-C200
6600	4822 130 82037	HZT33
6602Δ	4822 130 30621	1N4148
6800Δ	4822 130 31024	BZX79-B18

7100	4822 209 13047	TDA8361/N5-S7
7103	5322 130 42755	BC847C
7105	4822 130 60511	BC847B
7107	4822 209 12635	TDA4665/V5
7107	4822 209 16804	TDA4665/V5
7109	4822 130 60511	BC847B
7300	4822 130 41782	BF422
7310	4822 130 41782	BF422
7320	4822 130 41782	BF422
7420Δ	4822 130 10025	ONX82A
7421	5322 130 44647	BC368
7422Δ	4822 130 10025	ONX82A
7423	5322 130 41983	BC858B

12 Spare parts list

7424	4822 130 40937	BC548B
7500	5322 130 41983	BC858B
7501	4822 130 61675	BF487
7502	4822 130 41646	BF423
7504	4822 130 63725	STP4NA40FI
7505Δ	4822 130 41344	BC337-40
7600	4822 209 16928	SAA5296PS/095
7600	4822 209 17219	SAA5296PS
7601Δ	4822 209 73852	PMBT2369
7602	5322 130 60159	BC846B
7603	4822 130 60511	BC847B
7605	4822 209 12948	ST24C02B6
7606Δ	5322 130 41982	BC848B
7608Δ	5322 130 41982	BC848B
7804	4822 130 60511	BC847B
\	4822 267 31858	1 P
	4822 267 51033	SINGLE CONNECTOR

Stereo amplifier panel

Various

	4822 265 10841	8 P MALE 2.50 F-PININ
	4822 267 10543	7 P MALE 2.50 F-PIN
	4822 265 30899	5 P.
Δ	4822 492 62076	FOR TRANSISTORS
1010	4822 212 11313	MOD AUDI STEREO NICAM L
1010	4822 212 11314	MOD AUDIO STEREO NICAM BG
1010	4822 212 11315	MOD AUDIO STEREO BG
1200	4822 242 10688	OFWK9456M
1200	4822 242 81854	B39389-G9353-M100
1201	4822 242 81436	OFWK3953M
1202Δ	4822 071 53151	19372(315MA)
1221	4822 242 10434	CER(18,432MHz)

2200	4822 124 41643	100µF 20% 16V
2201Δ	4822 126 10002	100nF 20% 25V
2202	4822 126 13473	220nF 80-20% 50V
2203	4822 124 40723	2200µF 20% 16V
2204	4822 126 13473	220nF 80-20% 50V
2205Δ	4822 126 10002	100nF 20% 25V
2206	4822 122 31175	1nF 10% 500V
2207Δ	4822 126 13185	680pF 10% 500V
2208	4822 126 13692	47pF 1% 63V
2209	4822 124 41751	47µF 20% 50V
2210Δ	4822 126 10002	100nF 20% 25V
2211	4822 126 13692	47pF 1% 63V
2212	4822 122 33797	47nF 20% 50V
2213Δ	5322 126 10223	4.7nF 10% 63V
2214	4822 126 13473	220nF 80-20% 50V
2215	4822 124 40763	2.2µF 100 V
2216	4822 126 13296	100nF 10% 16V
2217Δ	4822 126 10002	100nF 20% 25V
2218	4822 124 40763	2.2µF 100 V
2219Δ	4822 126 10002	100nF 20% 25V
2220	4822 124 40763	2.2µF 100 V
2221	5322 126 10511	1nF 5% 50V
2222	4822 126 13473	220nF 80-20% 50V
2224Δ	4822 124 41579	10µF 20% 50V
2225	5322 126 10511	1nF 5% 50V
2228	5322 126 10511	1nF 5% 50V
2229	5322 126 10511	1nF 5% 50V
2230Δ	4822 126 10002	100nF 20% 25V
2231Δ	4822 122 33172	390pF 5% 50V
2232Δ	4822 122 33172	390pF 5% 50V
2233Δ	4822 124 41579	10µF 20% 50V
2234Δ	4822 126 10002	100nF 20% 25V
2235	4822 124 40769	4.7µF 20% 100V
2238Δ	4822 124 41579	10µF 20% 50V
2239Δ	4822 126 10002	100nF 20% 25V
2240Δ	4822 124 41579	10µF 20% 50V
2242Δ	4822 126 10002	100nF 20% 25V
2243	5322 122 32268	470pF 10% 50V
2244	5322 122 32268	470pF 10% 50V
2254Δ	4822 126 10002	100nF 20% 25V
2256Δ	4822 124 41579	10µF 20% 50V
2257Δ	4822 126 10002	100nF 20% 25V
2258	4822 126 13614	4N710% 50V
2259	4822 126 13692	47pF 1% 63V
2262	5322 122 32286	3.3pF 5% 50V
2263	5322 122 32286	3.3pF 5% 50V
2273Δ	5322 126 10223	4.7nF 10% 63V

3201Δ	4822 053 11189	18Ω 5% 2W
3202	4822 051 20159	15Ω 5% 0.1W
3203	4822 116 83883	470Ω 5% 0.5W
3204	4822 116 52238	12k 5% 0.5W
3206Δ	4822 051 20472	4k7 5% 0.1W
3207Δ	4822 051 20472	4k7 5% 0.1W
3208	4822 117 11449	2k2 1% 0.1W
3210	4822 051 20223	22k 5% 0.1W
3211Δ	4822 051 20472	4k7 5% 0.1W
3212	4822 051 20223	22k 5% 0.1W
3213	4822 116 52304	82k 5% 0.5W
3214Δ	4822 051 20472	4k7 5% 0.1W
3215Δ	4822 051 20472	4k7 5% 0.1W
3216	4822 117 11449	2k2 1% 0.1W
3217	4822 051 20104	100k 5% 0.1W
3219	4822 051 20562	5k6 5% 0.1W 0805
3220	4822 051 20104	100k 5% 0.1W
3221	4822 051 20223	22k 5% 0.1W
3221Δ	4822 051 20472	4k7 5% 0.1W
3221	4822 117 11448	180Ω 1% 0.1W
3222	4822 117 11448	180Ω 1% 0.1W
3223Δ	4822 052 10151	150Ω 5% 0.33W
3224	4822 117 11454	820Ω 1% 0.1W
3228	4822 051 20273	27k 5% 0.1W
3229	4822 051 20273	27k 5% 0.1W
3231	4822 116 83872	220Ω 5% 0.5W
3232	4822 116 83872	220Ω 5% 0.5W
3233	4822 117 10834	47k 1% 0.1W
4xxx	4822 051 10008	0Ω 5% 0.25W (1206)
4xxx	4822 051 20008	0Ω 5% 0.25W (0805)

5202	4822 157 10586	2.2µH 10% 0805
5203	4822 157 11014	IND 78mH
5204	4822 157 71403	15µH
5206	4822 152 20677	10µH
5207	4822 152 20677	10µH

6220Δ	4822 130 30621	1N4148
6221	4822 130 34382	BZX79-B8V2
6222Δ	4822 130 31024	BZX79-B18
6223Δ	4822 130 30621	1N4148
6224Δ	4822 130 30621	1N4148
6225Δ	4822 130 34173	BZX79-B5V6
6226Δ	4822 130 30621	1N4148

7202Δ	5322 130 41982	BC848B
7203Δ	5322 130 41982	BC848B
7204	5322 130 42631	BD243
7205	4822 209 13646	TDA7057AQ/N2
7206	4822 209 13003	TDA9811/V3
7207Δ	5322 130 41982	BC848B
7208	5322 130 41983	BC858B
7221	4822 209 13099	MSP3400C/C6
7221	4822 209 15832	MSP3410D-PP-B4

Deflection panels

Various

	4822 212 11359	DEFL MODULE 110 DEGR PCB
	4822 212 11533	DEFL MODULE 90 DEGR PCB
Δ	4822 265 30877	3P
Δ	4822 265 30389	2P MALE
	4822 267 10645	CON 12P. MALE
	4822 255 10386	HEATSINK LINE/ FRAME
201Δ	4822 492 62076	SPRING FOR TRANSISTORS
	4822 492 70871	SPRING GR2
	4822 492 70871	SPRING GR2
203Δ	4822 492 62076	FOR TRANSISTORS
	4822 492 70871	SPRING GR2
204	4822 492 42769	IC SPRING
	4822 492 70871	SPRING GR2

2900	5322 121 42498	680nF 5% 63V
2900	5322 121 42661	330nF 5% 63V
2901	4822 121 41673	220nF 10% 100V
2901	5322 121 42661	330nF 5% 63V
2902	4822 124 40242	1µF 20% 63V
2903	4822 126 10334	470pF 10% 50V
2904	4822 124 41751	47µF 20% 50V
2904	4822 124 81029	100µF 20% 25V
2905	4822 124 22263	220µF 20% 25V
2906Δ	4822 124 40433	47µF 20% 25V
2906	4822 124 41751	47µF 20% 50V
2907	5322 124 41468	1000µF 20% 40V
2908	4822 124 81151	22µF 50V
2909	4822 121 51305	15nF 10% 50V
2910	4822 121 10701	11nF 5% 1KV
2910Δ	4822 121 70637	8.2nF 5% 1600V
2911	4822 121 40516	22nF 10% 250V
2912Δ	4822 126 13451	2.2nF 10% 2KV
2913Δ	4822 121 10518	250V 390nF 5%
2914	4822 124 80341	1µF 20% 160V
2915	4822 121 10506	250V 560nF 5% TYPE2222374
2915Δ	4822 121 10518	250V 390nF 5%
2916	4822 124 11558	2200µF 20% 250V.
2916	5322 124 41468	1000µF 20% 40V
2917	4822 122 30043	10nF 80% 63V
2918	4822 121 10692	82nF 10% 250V
2919Δ	4822 126 13185	680pF 10% 500V

3900	4822 050 22205	2M2 1% 0.6W
3901	4822 050 22205	2M2 1% 0.6W
3901	4822 116 52235	1M 5% 0.5W
3902	4822 116 52283	4k7 5% 0.5W
3903	4822 101 11187	1k 30%LIN 0.1W
3904	4822 116 52235	1M 5% 0.5W
3904	4822 116 52245	150k 5% 0.5W
3905	4822 116 52175	100Ω 5% 0.5W
3906	4822 050 11002	1k 1% 0.4W
3907	4822 116 52188	27Ω 5% 0.5W
3907	4822 116 52199	68Ω 5% 0.5W
3908Δ	4822 052 10228	2Ω2 5% 0.33W
3908Δ	4822 052 10478	4Ω7 5% 0.33W
3909Δ	4822 053 10221	220Ω 5% 1W
3909	4822 117 12851	4k7 5% 3W
3910	4822 053 11221	220Ω 5% 2W
3910	4822 116 83883	470Ω 5% 0.5W
3911	4822 116 83872	220Ω 5% 0.5W
3912	4822 116 83883	470Ω 5% 0.5W
3913	4822 100 11819	100k 30%LIN 0.1W
3914	4822 116 80676	1Ω5 5% 0.5W
3915	4822 116 80676	1Ω5 5% 0.5W
3916	4822 116 83882	39k 5% 0.5W
3917	4822 116 52257	22k 5% 0.5W
3918	4822 116 52304	82k 5% 0.5W
3919	4822 116 52289	5k6 5% 0.5W
3920	4822 116 52283	4k7 5% 0.5W
3921	4822 100 11819	100k 30%LIN 0.1W
3922	4822 050 11002	1k 1% 0.4W
3923	4822 116 52226	560Ω 5% 0.5W
3923	4822 116 52256	2k2 5% 0.5W
3924	4822 101 11191	10k 30%LIN 0.1W
3925	4822 116 52271	33k 5% 0.5W
3926	4822 116 83878	270k 5% 0.5W
3927	4822 116 52256	2k2 5% 0.5W
3927	4822 116 52269	3k3 5% 0.5W
3928Δ	4822 052 11108	1Ω 5% 0.5W
3929	4822 116 83872	220Ω 5% 0.5W
3930	4822 052 11561	560Ω 5% 0.5W
3933	4822 050 11002	1k 1% 0.4W
3933	4822 116 52234	100k 5% 0.5W
3934	4822 116 52252	180k 5% 0.5W
3935	4822 116 52252	180k 5% 0.5W

5900Δ	4822 157 11397	LIN. CORECTOR COIL
5900Δ	4822 157 63079	AT4042/97
5901Δ	4822 157 11193	FXC COIL ASSY - CI15

6900Δ	4822 130 30621	1N4148
6900	4822 130 34382	BZX79-B8V2
6901Δ	4822 130 34173	BZX79-B5V6
6901	4822 130 34382	BZX79-B8V2
6902	4822 130 42488	BYD33D
6903	4822 130 42488	BYD33D
6904Δ	4822 130 30621	1N4148
6905	4822 130 34278	BZX79-B6V8
6906	4822 130 11369	BY278-20
6906Δ	4822 130 32896	BYD33M
6906Δ	4822 130 41275	BY228
6907Δ	4822 130 42489	BYD33G

7900Δ	4822 130 44461	BC546B
7901Δ	4822 130 44197	BC558B
7902	4822 130 40855	BC337
7902Δ	4822 130 40981	BC337-25
7903	4822 130 40917	BD238
7904	4822 130 63574	BD241CFI
7905	4822 130 41246	BC327-25
7906Δ	4822 130 10206	BUT11AX
7906Δ	4822 130 10864	BU1508AX
7907	4822 130 40937	BC548B
7908	4822 130 63725	STP4NA40FI

S.O.P.S Kit

4822 310 10663 L6 SOPS kit

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PHILIPS

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Art. Code: 03
Sachgebiet: CTV

Memo: DE10BEA

SI

Wichtig für die Werkstatt! 3645

Nummer: 4822 830 03013

Datum: 17.03.1999

Service Information

Betrifft: L 6.2 / L 6.3

Verteiler: S1,F1

Im Service-Manual für das L6.2-Chassis (4822 727 21532) fehlt die Stückliste der Ersatzteile für das 110 Grad Ablenkmodul.

Bitte benutzen Sie hierzu das Service-Manual für das Chassis L6.3 AA

Bestellnummer: 4822 727 21674

Form 80 048

Nachdruck nicht gestattet! Änderungen vorbehalten.